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Drawing a Line in the Patent Subject Matter Sands: Does Europe Provide A Solution to the Software & Business Method Patent Problem?

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DRAWING A LINE IN THE PATENT SUBJECT-MATTER SANDS: DOES EUROPE PROVIDE A SOLUTION TO THE SOFTWARE AND BUSINESS METHOD PATENT PROBLEM?

SUSAN J. MARSNIK*
ROBERT E. THOMAS**

Abstract: In June 2010, the Supreme Court issued its decision in *Bilski v. Kappos*, a case that had the potential to rewrite the landscape for determining what types of computer-related and business method inventions would receive patent protection. Just six weeks earlier, the European Patent Office's Enlarged Board of Appeal delivered a decision on the same subject matter that had the potential to produce similar change in Europe. Yet, given these two opportunities to overhaul imperfect patent systems, neither decision provided more than incremental change. This Article explains why neither jurisdiction is able or willing to produce comprehensive reform in this area, and seeks to illuminate the nature of patent reform that is possible on the two continents.

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INTRODUCTION

The status of business methods and software as patent subject matter is one of the most controversial debates in patent law.¹ These patents, or a subset thereof, are considered to be overly broad in scope,² sources of many “patent troll” lawsuits,³ unlikely to advance the prior

¹ See, e.g., John R. Allison & Starling D. Hunter, *On the Feasibility of Improving Patent Quality One Technology at a Time: The Case of Business Methods*, 21 BERKELEY TECH. L.J. 729, 736–38 (2006) (analyzing the PTO’s Second Pair of Eyes Review and concluding that patent reform efforts are inadequate); John R. Allison & Emerson H. Tiller, *The Business Method Patent Myth*, 18 BERKELEY TECH. L.J. 987 *passim* (2003) (providing empirical evidence that the quality of business method patent claims are not significantly inferior to other patent claims); Wade M. Chumney et al., *Patents Gone Wild: An Ethical Examination and Legal Analysis of Tax-Related and Tax Strategy Patents*, 46 AM. BUS. L.J. 343, 357–71 (2009) (examining the patentability of tax strategy business methods); David S. Olson, *Taking the Utilitarian Basis for Patent Law Seriously: The Case for Restricting Patentable Subject Matter*, 82 TEMP. L. REV. 181, 188–90 (2009) (citing software and business methods as fueling the “continuing high volume of bad patents”); Carl Shapiro, *Patent System Reform: Economic Analysis and Critique*, 19 BERKELEY TECH. L.J. 1017, 1018 (2004) (noting criticism of the quality of computer software and Internet business methods); Robert E. Thomas, *Debugging Software Patents: Increasing Innovation and Reducing Uncertainty in the Judicial Reform of Software Patent Law*, 25 SANTA CLARA COMPUTER & HIGH TECH. L.J. 191 *passim* (2008) (arguing that business method and software patents may discourage rather than promote innovation); Robert E. Thomas & Larry A. DiMatteo, *Harmonizing the International Law of Business Method and Software Patents: Following Europe’s Lead*, 16 TEX. INTELL. PROP. L.J. 1, 45–46 (2007) (recommending adoption of European treatment of business method and software patents).

² See Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1688 (2003) (arguing that the Federal Circuit has encouraged broad drafting of software claims where narrow claims are optimal); Julie E. Cohen & Mark A. Lemley, *Patent Scope and Innovation in the Software Industry*, 89 CALIF. L. REV. 1, 5 (2001) (concluding that broad software patent scope is not optimal).

³ John R. Allison et al., *Extreme Value or Trolls on Top? The Characteristics of the Most-Litigated Patents*, 158 U. PA. L. REV. 1, 3 (2009) (providing empirical evidence that the most

art due to lax disclosure requirements,⁴ and generally undeserving of patent protection.⁵ Due to the questioned legitimacy of these patents, there has been resistance to the unqualified ratification of business method and software patent subject-matter status on both sides of the Atlantic.⁶ Nevertheless, solutions to the perceived problems of business method and software patents have been ephemeral. Like shifting sand, proposals and approaches have been accepted and rejected at a seemingly increasing rate on both continents.⁷

litigated patents are held by non-practicing entities—so called “trolls”—and disproportionately cover software inventions).

⁴ See Burk & Lemley, *supra* note 2, at 1688–89 (arguing that weak disclosure requirements allow broad claims that can stifle “subsequent incremental improvements”).

⁵ See Rochelle Cooper Dreyfuss, *Are Business Methods Patents Bad for Business?*, 16 SANTA CLARA COMPUTER & HIGH TECH L.J. 263, 275–77 (2000) (arguing that the limited benefits from business method patents do not exceed their social costs); Thomas, *supra* note 1, at 210–11, 218 (extending Dreyfuss’ social welfare analysis to software patents).

⁶ See Burk & Lemley, *supra* note 2, at 1689–90 (recommending policy changes to limit the scope of software patents); see also PHILIP LEITH, *SOFTWARE AND PATENTS IN EUROPE* 154–55 (2007) (describing the highly organized opposition from open source and SME groups that made moving forward on a software directive to liberalize treatment of software claims difficult); Reinier Bakels & P. Bernt Hugenholtz, *The Patentability of Computer Programs: Discussion of European-Level Legislation in the Field of Patents for Software* 26 (European Parliament, Comm. on Legal Affairs and the Internal Mkt., Working Paper, 2002), available at <http://www.europarl.europa.eu/meetdocs/committees/juri/20020619/SoftwarePatent.pub.pdf> (noting that “the crucial question” for EU legislation is “not whether software patents should be allowed, but what software patents should be permitted”); Press Release, Charlie McCreevy, European Comm’r for Internal Mkt. & Servs., Statement to the European Parliament on Computer-Implemented Inventions (Mar. 8, 2005), available at <http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/05/151&format=HTML&aged=0&language=EN&guiLanguage=en> (“The Commission’s intention in making its proposal was to avoid patenting of pure software and clearly differentiate the EU from the US.”).

⁷ See Tanya Aplin, *Patenting Computer Programs: A Glimmer of Convergence*, 30 EUR. INTEL. PROP. REV. 379, 382 (2008) (arguing that the U.K. courts’ reluctance to follow the EPO approach represents an elevation of form over substance); Rosa Maria Ballardini, *Software Patents in Europe: The Technical Requirement Dilemma*, 3 J. INTEL. PROP. L. & PRAC. 563, 565–73 (2008) (tracing shifting standards and tests in the EPO, United Kingdom, and German courts); Christopher Laub, *Software Patenting: Legal Standards in Europe and the US in View of Strategic Limitations of the IP Systems*, 9 J. WORLD INTEL. PROP. 344, 366–67 (2007); Christopher de Mauny, *Court of Appeal Clarifies Patenting of Computer Programs*, 31 EUR. INTEL. PROP. REV. 147, 150 (2009) (discussing *Symbian* case and its move towards seeking compromise with EPO); Noam Shemtov, *The Characteristics of Technical Character and the Ongoing Saga in the EPO and English Courts*, 4 J. INTEL. PROP. L. & PRAC. 506, 506–12 (2009) (examining the differences in approaches in EPO and U.K. courts and noting that U.K. decisions are irreconcilable with those of EPO and EPO decisions are often irreconcilable with each other); Helen Wallis, *Patentability of Computer-Implemented Inventions: The Changing Landscape in 2008*, 14 COMM. L.J. COMPUTER MEDIA & TELECOMM. 4, 4–7 (2009).

The shifts have been so dramatic that the Court of Appeals for the Federal Circuit (CAFC) reaffirmed a seemingly discredited⁸ subject-matter test for business method and software patent claims.⁹ This reaffirmation left the Supreme Court with the unenviable task of either ratifying a test that previous courts refused to embrace or developing a viable solution that has eluded courts for decades.¹⁰ During oral arguments in *Bilski v. Kappos*, the Supreme Court seemed willing to explore all avenues for a possible solution to this conundrum.¹¹ Justice Ginsburg queried whether the tied-to-technology requirement upon which European patents rest could provide a workable subject-matter test for business methods and software patents in the United States.¹² Justice Ginsburg's query suggests that at least some members of the Supreme Court did not find any of their options inviting and held some hope that European law might provide a remedy that the Supreme Court could use to rescue the United States' patent system from its subject-matter malaise.

In this Article, we address Justice Ginsburg's query by examining United States and European patent law to determine whether there is viable legal or policy support for a patent subject-matter test that provides the patent law community with clear guidelines for distinguishing "deserving" patents from "undeserving" patents. Now that the Supreme Court has issued a decision that basically orders the CAFC to "reboot" its patent process subject-matter approach—with little more than the exclusion against abstract ideas and 1980s-era Supreme Court precedents—the need for clear guidance in this area of patent law is even more pressing.¹³ The European Patent Convention (EPC)¹⁴ appears to contain provisions that address this problem. Courts have consistently

⁸ *In re Bilski*, 545 F.3d 943, 978–83 (2008) (Newman, J. dissenting), *aff'd sub nom. Bilski v. Kappos*, 130 S. Ct. 3218, 3227–31 (2010).

⁹ *Id.* at 963–66 (reaffirming use of the machine or physical transformation test to determine whether processes are valid statutory patent subject matter).

¹⁰ *See Bilski*, 130 S. Ct. at 3223–25; *In re Bilski*, 545 F.3d at 978–985 (Newman, J., dissenting).

¹¹ *See* Transcript of Oral Argument at 12–13, *Bilski v. Kappos*, 130 S. Ct. 3218 (2010) (No. 08-964).

¹² *See id.*

¹³ *See Bilski*, 130 S. Ct. at 3225–26, 3229.

¹⁴ Convention on the Grant of European Patents art. 52, Oct. 5, 1973, 1065 U.N.T.S. 254, as revised Nov. 29, 2000 [hereinafter EPC 2000], available at <http://www.epo.org/patents/law/legal-texts/html/epc/2000/e/ma1.html>.

interpreted the EPC to require that all patents be “technical,”¹⁵ and to exclude explicitly business methods and “programs for computers” from patent subject-matter coverage in Article 52(2).¹⁶ The strong exclusion is chimeric, however, offering less hope for a solution than previously considered U.S. approaches.

The clarity of the EPC exclusion is severely muddled by modifying language in Article 52(3)¹⁷ and by the complexity and fragmentation of the European patent system.¹⁸ Unlike the centralized United States patent system, national patent systems in Europe coexist with the European Patent Office (EPO), both of which apply and interpret the EPC.¹⁹ There are no pan-European courts that correspond to the CAFC and the U.S. Supreme Court.²⁰ In Europe both the EPO and national courts have jurisdiction over patent subject-matter appeals.²¹ As one commentator put it, “[t]he resulting edifice is byzantine in complexity.”²² Although national courts strive to harmonize their decisions with EPO Technical Board of Appeal decisions, significant conflicts have, nonetheless, developed. For example, the potential exists for a computer software patent granted by the EPO to be invalidated under current U.K. law because of that country’s more restrictive interpretation of the EPC.²³ Realization of this potential would render one of the EPC’s main tenets meaningless: namely, that patents granted at the EPO are valid in contracting states as if they were granted by the national office.²⁴

Elevating the probability of legal discord is the EPO Enlarged Board of Appeal’s denial of the existence of conflicting decisions within the EPO and the Board’s refusal to clarify the meaning of “technical” as

¹⁵ Thomas & DiMatteo, *supra* note 1, at 17 (“While there is no explicit requirement in the EPC for technical character or a ‘technical contribution,’ the patent courts initially interpreted the EPC as including such a requirement.”).

¹⁶ EPC 2000, *supra* note 14, at 271–72.

¹⁷ *See id.* at 272 (limiting Art. 52(2) exclusions to the extent that a patent or patent application relates to the excluded subject matter or activities “as such”).

¹⁸ WILLIAM CORNISH & DAVID LLEWELYN, *INTELLECTUAL PROPERTY: PATENTS, COPYRIGHT, TRADE MARKS AND ALLIED RIGHTS*, 114 (6th ed. 2007) (describing the EPO and UK patent systems and their interaction); *infra* Part IV(B).

¹⁹ *See* EPC 2000, *supra* note 14, at 258–59, 294–96.

²⁰ *See id.* at 259–71 (outlining the structure of European institutions of patent review).

²¹ *Cf.* CORNISH & LLEWELYN, *supra* note 18, at 114 (describing the EPO and U.K. patent systems and their interaction).

²² *Id.*

²³ *See* GUY TRITTON ET AL., *INTELLECTUAL PROPERTY IN EUROPE* 86 (3d ed. 2008).

²⁴ Shemtov, *supra* note 7, at 514.

applied to European patent subject matter.²⁵ Therefore, in addition to shaping patent subject-matter policy for business methods and software, Europe must also resolve conflicting approaches within the EPC and between countries with disparate and sometimes inconsistent approaches to patent policy. Europe cannot take these steps until there is a European patent court with jurisdiction to settle these interpretive differences.

Another impediment to European reform is the extremely liberal U.S. approach to software and business method patents. Implementing clear guidelines and boundaries could handicap European inventors and businesses relative to their U.S. counterparts, which enjoy the liberal U.S. treatment of software and business method claims. Hence, clarity and well-defined constraints in Europe may occur only after the United States has shifted its patent policy to include clear limitations on software and business method patents. Thus, it appears highly unlikely that Europe can provide the U.S. patent system with the guidance it apparently seeks.

This Article's analysis of U.S. and European approaches to the patentability of business methods and software supports this rather pessimistic conclusion. Conceptually, the only significant differences between these invention types and mental processes that do not receive patent protection are speed, capacity, and accuracy. There is nothing that computer software controlling an electronic device cannot perform that a human mind cannot also perform using paper and pencil and sufficient time. Nevertheless, these differences coupled with technologically advanced computer equipment make software valuable and capable of performing tasks that cannot be done practically by the human mind alone.

Part I of the Article discusses the nature of software and business methods.²⁶ Parts II, III, and IV, respectively, examine the development and present state of patent law in the United States,²⁷ European Patent Office,²⁸ and United Kingdom.²⁹ The Article concludes by identifying the implications of this discussion. Our analysis shows that there is no unequivocal legal support for a patent subject-matter rule that excludes

²⁵ Case G-3/08, *Programs for Computers*, [2010] O.J.E.P.O. 17, 19–30, 31 (Enlarged Bd. Appeal, May 12, 2010), *available at* http://archive.epo.org/epo/pubs/oj011/01_11/01_0101.pdf.

²⁶ *See infra* Part I.

²⁷ *See infra* Part II.

²⁸ *See infra* Part III.

²⁹ *See infra* Part IV.

all inventions that include software or business methods under either patent system.³⁰ There is also no unequivocal support for recognizing software and business methods as patent subject matter.³¹ The problem lies in the absence of clear, unambiguous legislative direction on either continent.³² The manifestation of this lack of a solid policy foundation in the United States has been the repeated adoption and rejection of different judicial approaches.³³ In Europe, on the other hand, the lack of legislative direction combined with the absence of a centralized court system has resulted in conflicting and shifting approaches in the judicial treatment of software patent subject matter.³⁴

I. SOFTWARE AND BUSINESS METHOD PATENTS

To appreciate the dilemma that courts and policy makers face in addressing the software and business method patentability question, understanding the nature of software is critical. Therefore, we begin our analysis by discussing the general nature of software and business method patents and their treatment under U.S. law. Conceptually, software and business methods are closely related.³⁵ Both are abstract processes that do not independently produce tangible results.³⁶ An ad-

³⁰ See *infra* Parts II–IV.

³¹ See *Bilski*, 130 S. Ct. at 3231 (rejecting prior test for patentable subject matter and permitting the Federal Circuit to develop a new test based on the abstract ideas exclusion); Case T-208/84, *Computer-Related Invention/VICOM*, [1987] O.J.E.P.O. 14 (Technical Bd. Appeal 3.5.01, July 15, 1986) (noting uncertainty in claims involving business methods or software and additional variables), available at http://archive.epo.org/epo/pubs/oj1987/p001_046.pdf.

³² See *infra* text accompanying notes 166, 366–406.

³³ Compare *Bilski*, 130 S. Ct. at 3231 (rejecting prior test for patentable subject matter and permitting the Federal Circuit to develop a new test based on the abstract ideas exclusion), with *State St. Bank & Trust Co. v. Signature Fin. Grp. Inc.*, 149 F.3d 1368, 1373 (Fed. Cir. 1998) (recognizing the patentability of a computer algorithm that produces a “useful, concrete and tangible result”).

³⁴ See, e.g., *VICOM*, [1987] O.J.E.P.O. at 14 (noting uncertainty in claims involving business methods or software and additional variables).

³⁵ See Allison & Tiller, *supra* note 1, at 1012 (arguing, in a section entitled “A Bit of Software Patent Déjà Vu,” that most criticisms of business method patents have already been applied toward software patents); Thomas, *supra* note 1, at 193 n.6 (arguing that “[b]usiness methods are part of the continuum [of patents] that includes software and computer-implemented inventions”).

³⁶ See *Gottschalk v. Benson*, 409 U.S. 63, 71–73 (1972) (distinguishing between software and traditional process claims, which do produce tangible results); Robert P. Merges, *As Many as Six Impossible Patents Before Breakfast: Property Rights for Business Concepts and Patent System Reform*, 14 *BERKELEY TECH L.J.* 577, 578–79 (1999) (recounting that business method and software inventions were previously considered too abstract for patent coverage); James Gleick, *Patently Absurd*, *N.Y. TIMES*, Mar. 12, 2000, (Magazine), available at <http://www.nytimes.com/2000/03/12/magazine/patently-absurd.html?scp=2&sq=Patently+Absurd&st=nyt> (arguing

ditional similarity is that business methods are often implemented through computer software.³⁷ Under the “machine-or-transformation test” championed in *In re Bilski*, business methods that are not computer or machine implemented are unlikely to survive a subject-matter challenge.³⁸ Whether business methods or computer software are statutory subject matter when “computer implemented” is a more difficult determination. When “computer implemented,” the business method is computer software.³⁹ A major question that courts on both sides of the Atlantic have struggled with is whether implementing software or a business method through a computer or other machine is necessary or sufficient to render such claims valid statutory subject matter.⁴⁰ Or, more generally, under what circumstances are business methods or computer programs capable of becoming patentable inventions?

Therefore, determining whether and under what circumstances software should be valid statutory subject matter under U.S. law, or statutorily excluded subject matter under European law, requires an understanding of the nature of computer software. Modern computers consist of tangible physical components including one or more processing units, graphical and input-output subsystems, memory chips, storage devices, and other support systems.⁴¹ Software provides the means

that business method and software patents had crossed into the realm of thought and abstraction with nuts and bolts that are “vaporous and intangible”).

³⁷ See Rebecca A. Hand, *eBay v. MercExchange: Looking at the Cause and Effect of a Shift in the Standard for Issuing Patent Injunctions*, 25 CARDOZO ARTS & ENT. L.J. 461, 470–71 (2007) (“Many business method patents are, in fact, patents on the transfer of a known business method to a software and/or Web-based implementation.”); see also GREGORY A. STOBBS, BUSINESS METHOD PATENTS § 3.01 (2002) (“Virtually all of the e-commerce patents, by their very nature, involve electronic communication technology, or Internet technology.”).

³⁸ See *In re Bilski*, 545 F.3d 943, 964–66 (2008), *aff’d sub nom. Bilski v. Kappos*, 130 S. Ct. 3218 (2010).

³⁹ See Hand, *supra* note 37, at 470–71.

⁴⁰ See, e.g., *Benson*, 409 U.S. at 71–72 (analyzing whether a computer program useful only in connection with a computer is not a patentable process); *Ex parte Carl A. Lundgren*, No. 2003–2088, (B.P.A.I. Apr. 20, 2004) (noting that business methods performed by a machine have long been considered patentable subject matter); Case T-931/95, *Controlling Pension Benefit Systems Partnership/PBS PARTNERSHIP*, [2001] O.J.E.P.O. 441, 450 (Technical Bd. Appeal 3.5.01, Sept. 8, 2000), available at <http://www.epo.org/law-practice/case-law-appeals/pdf/t950931ep1.pdf> (finding that the use of a computer in application of a method does not change the essential nature of the claim nor does it endow a “purely non-technical purpose with a technical character”).

⁴¹ See Jack M. Haynes, *Computer Software: Intellectual Property Protection in the United States and Japan*, 13 J. MARSHALL J. COMPUTER & INFO. L. 245, 247 (1995); Robert Plotkin, *Fighting Keywords: Translating the First Amendment To Protect Software Speech*, 2003 U. ILL. J.L. TECH. & POL’Y 329, 369 n.149.

by which human users interact with and control these myriad computer systems.⁴² Software allows computer users to give instructions to computers to perform a variety of tasks.⁴³ The term software also applies to information stored on, used, and manipulated by computers.⁴⁴ The term software additionally includes the internal routines that allow different parts of the computer to interact with each other and to translate human input into instructions that computers understand.⁴⁵

Conceptually, there is little to distinguish software patent claims from claims involving abstract ideas, algorithms, and mental processes that courts consistently rejected prior to the 1998 case before the CAFC, *State Street Bank v. Signature Financial Group*.⁴⁶ Computers and the human mind operate similarly by processing algorithms.⁴⁷ Mathematical algorithms, computer programs, and mental processes are ways of “defining abstract relationships among concepts and [with] defining rules about how those concepts should be manipulated.”⁴⁸ Thus, for example, the area of a rectangle can be characterized by the relationship between the base and height of the geometric figure and defined as the product of those two elements.⁴⁹ There is no conceptual difference between calculating this area in one’s mind, with pencil and paper, and calculating this area through the use of a programmed computing device. Many psychologists model human thought processes as a series of computational steps.⁵⁰ According to these psychologists, human thought proc-

⁴² GREGORY A. STOBBS, *SOFTWARE PATENTS*, § 2.02 (2000) (“[S]oftware is what empowers a computer to handle information and to control information flow.”).

⁴³ Haynes, *supra* note 41, at 247 (“A computer is useless without software.”).

⁴⁴ STOBBS, *supra* note 42, § 2.02 (“[S]oftware is information that is fed into the input, placed in storage, and then delivered from storage to the computer.”).

⁴⁵ Andrew Rodau, *Computer Software: Does Article 2 of the Uniform Commercial Code Apply?* 35 EMORY L.J. 853, 867–68, 868 n.57 (1986) (noting that the term “software” is confusing because it applies to many different aspects of the computing process including internal and external computer functions).

⁴⁶ See 149 F.3d 1368, 1373 (Fed. Cir. 1998).

⁴⁷ See BEN KLEMENS, *MATH YOU CAN’T USE: PATENTS, COPYRIGHTS, AND SOFTWARE* 26 (2006) (suggesting that computers and the human brain operate similarly by following certain paths from problem statement to solution); Pamela Samuelson, *Benson Revisited: The Case Against Patent Protection for Algorithms and Other Computer Program-Related Inventions*, 39 EMORY L.J. 1025, 1123 (1990) (reporting that computer scientist Allen Newell concludes that “no meaningful distinction can be made between algorithms and mental processes”).

⁴⁸ Samuelson, *supra* note 47, at 1123.

⁴⁹ See *id.*

⁵⁰ *Id.* (quoting Professor Newell as stating, “humans think by means of algorithms. Sequences of mental steps and algorithms are the same thing.”).

esses, mathematical equations, and computer programs are algorithms that have no conceptual difference.⁵¹

The difference between computer processing and human mental processes is thus more quantitative than qualitative. The computer is faster, more capacious, and more accurate than the human mind.⁵² These improvements allow computers to accomplish tasks that cannot be accomplished by humans working alone. Managing and manipulating scientific experiments, rocket launches, and graphical representations all require the speed, precision, and tremendous storage capacity of computers.⁵³ The 1981 Supreme Court case *Diamond v. Diehr* provides a useful illustration of the value of computer technology.⁵⁴ The *Diehr* patent claim provided a novel way of curing artificial rubber.⁵⁵ The mathematical formula for completing this process, called the Arrhenius equation, was well known before submission of the *Diehr* application.⁵⁶ Applying the formula in an industrial context was difficult, however, because it required continual monitoring and adjustments to determine the precise time to terminate the curing process.⁵⁷ Without computer aid, humans could not collect process data and perform the required constant calculations to determine the optimal time to terminate the curing process.⁵⁸ The *Diehr* patent claim included a computer that was capable of accurately completing the repetitive calculations required by the Arrhenius formula and applying adjustments to the industrial process.⁵⁹

Mixed processes such as the *Diehr* method for curing rubber are at the crux of the subject-matter problem. EPC law and U.S. commentators who wish to limit patent subject matter agree that pure mental

⁵¹ See *id.* at 1123–24 (“[A]n algorithm for representing how a legal problem can be solved is just as ‘mathematical’ as an algorithm for addition, for finding the lowest common divisor for two numbers.”).

⁵² Laura R. Ford, *Alchemy and Patentability: Technology, “Useful Arts,” and the Chimerical Mind-Machine*, 42 CAL. W. L. REV. 49, 53 (2005) (explaining how modern computers are able to carry out tasks traditionally performed by human mental processes at a speed and level of accuracy that far exceeds human capabilities).

⁵³ See Michael J. Malinowski & Maureen A. O’Rourke, *A False Start? The Impact of Federal Policy on the Genotechnology Industry*, 13 YALE J. ON REG. 163, 166–67 (1996) (observing how “[t]he Human Genome Project . . . advanc[ed] more rapidly than originally predicted” due to “[i]nnovations in computer technology that enhance[d] the speed and precision of research and decrease[d] human error”).

⁵⁴ 450 U.S. 175, 177–78 (1981).

⁵⁵ *Id.* at 177.

⁵⁶ See *id.*

⁵⁷ See *id.* at 178.

⁵⁸ See *id.* at 178–79.

⁵⁹ See *id.*

processes and inventions without industrial or technical applications are not valid patent subject matter.⁶⁰ European courts and these commentators have trouble answering the question of how much more than a mental process is needed for an invention to receive a patent.⁶¹ In *Diehr*, the Court ruled that an invention that employed a mathematical algorithm was patent subject matter in large part because it was part of an industrial process.⁶² Such industrial processes, while employing software and mathematical algorithms, satisfy the *Bilski* machine or physical transformation test because the process as a whole takes industrial raw materials as input and produces a finished manufacture as an output.⁶³

Computers primarily interact with information when not connected to an industrial process.⁶⁴ Most computer end-users employ application programs, either purchased or custom-made, to perform desired tasks.⁶⁵ Common computer uses include word processing, database management, statistical and financial analysis, photograph and video editing, and game playing.⁶⁶ A program that solely applies a mathematical formula to data and delivers a result does not qualify as statutory subject matter.⁶⁷ Nevertheless, if the computer running the program is connected to a plotter or computer monitor that draws a graph of the calculation results, at least one court has held that the physical output is enough to render the entire process valid statutory subject matter.⁶⁸

If providing physical manifestations of data analysis is sufficient to qualify a process containing a computer program as statutory subject matter, however, there are virtually no constraints on software subject-matter patentability. The nature of computers and software engineer-

⁶⁰ See EPC 2000, *supra* note 14, at 108 (excluding business methods and computer programs as patentable subject matter); Thomas F. Cotter, *A Burkean Perspective on Patent Eligibility*, 22 BERKELEY TECH. L.J. 855, 860–61 (2007) (arguing that the disfavored mental steps doctrine still has merit).

⁶¹ See, e.g., Case T-208/84, Computer-Related Invention/VICOM, [1987] O.J.E.P.O. 14, 14–23 (Technical Bd. Appeal 3.5.01, July 15, 1986), available at http://archive.epo.org/epo/pubs/oj1987/p001_046.pdf (interpreting the “as such” modifier in EPC Art. 52 in the context of a computer-aided design program whose only contribution over the corresponding mental process was speed, and remanding case to Examining Division to consider redrafted claims).

⁶² See *Diehr*, 450 U.S. at 192–93.

⁶³ See *id.*

⁶⁴ See STOBBS, *supra* note 42, § 2.02.

⁶⁵ See *id.* § 1.04.

⁶⁶ See *id.* § 2.02.

⁶⁷ *Benson*, 409 U.S. at 71–72 (noting that granting a patent on such a claim would amount to granting a patent on a mathematical formula or pure idea).

⁶⁸ See *Arrhythmia Research Tech. v. Corazonix Corp.*, 958 F.2d 1053, 1060–61 (Fed. Cir. 1992).

ing means that most software can include output capabilities.⁶⁹ Modern programming and computer design employ a modular approach to manage the complexity of large programs.⁷⁰ Analogous to automobiles—which are built with tires, engines, brakes, and other components that perform specific discrete tasks—computer application programs are also built from multiple components that perform discrete tasks.⁷¹ Software functions may specify how the program handles data input-output routines or may provide methods for performing mathematical and statistical operations.⁷² These functions are offloaded to specialized systems that handle input-output and other functions. The programmer only needs to know the commands required to evoke the subsystems to produce desired results: there is no need to know exactly how the specialized subsystems achieve such results.⁷³ The programmer's ability to ignore redundant or highly specialized tasks is facilitated by the availability of off-the-shelf and generic function libraries.⁷⁴ These libraries can be used to provide capabilities for any program that requires the included tasks.⁷⁵ Programmers only need to understand the operation and syntax of library functions.⁷⁶ In fact, it is possible to create a word processor and other common computer applications using function libraries and just enough programming code to integrate the functions into a cohesive whole.⁷⁷ Most software programs thus run on "generic" computers and utilize standard methods for interacting with the external world that are available in off-the-shelf libraries, such as input-output, printing, and audio-visuals.⁷⁸ Thus, it seems that programmers need to focus on solving discrete problems rather than engaging in elaborate software engineering, unless available libraries are inefficient or deficient in some significant respect. Therefore, much software innovation is at the abstract information or algorithmic level.⁷⁹

Additionally, software patents suffer from excessive breadth.⁸⁰ Software patent applications do not include source code—the program writ-

⁶⁹ See STOBBS, *supra* note 42, § 2.02.

⁷⁰ Thomas, *supra* note 1, at 219.

⁷¹ *Id.*

⁷² *Id.*

⁷³ KLEMENS, *supra* note 47, at 41.

⁷⁴ *Id.*; see, e.g., WALTER SAVITCH, ABSOLUTE C++ 92 (1st ed. 2002) ("C++ comes with libraries of predefined functions that you can use in your programs.").

⁷⁵ See Thomas, *supra* note 1, at 219.

⁷⁶ See *id.*

⁷⁷ *Id.*

⁷⁸ See *id.*

⁷⁹ See *id.*

⁸⁰ See KLEMENS, *supra* note 47, at 73.

ten in a human language—and the United States Patent and Trademark Office (USPTO) often approves claims consisting of little more than a rudimentary flow chart.⁸¹ As a result, software patent holders lay claim to broad areas of software practice without well-identified claim boundaries, with virtually no implementation details, and with few clues about the quality of claim implementation.⁸² This practice appears inconsistent with patent law, which requires a claim's application to provide sufficient detail such that someone of ordinary skill in the relevant art is able to practice the invention.⁸³ This is the quintessential means by which knowledge is disseminated through the patent process.⁸⁴

The relaxation of disclosure requirements for software patent claims in the United States, codified in U.S. Code chapter 35, section 112,⁸⁵ is due to necessity.⁸⁶ Ironically, merely providing software source code would more fully satisfy the Section 112 disclosure requirements than the current practice. Source code consists of human-readable instructions that, when translated into a computer-readable format, give the computer detailed instructions that set forth the order in which the computer executes program steps and functions.⁸⁷ Source code is equivalent to a detailed blueprint of the program's construction and functions. Including software source code or detailed outlines of how a program operates would easily satisfy Section 112 enablement and best mode requirements.⁸⁸

Nevertheless, the CAFC has ruled that disclosing outcomes—or “functions”—without identifying detailed procedures—or “means”—meets the Section 112 burden for computer software.⁸⁹ Section 112 disclosures, in addition to creating a publicly accessible record of the invention, provide a check over the breadth and scope of claims.⁹⁰ To avoid overly expansive claims, patent law provides protection solely for the means of achieving identified functions—the “means-plus-function test.”⁹¹ But requiring software patents to meet the means-plus-function

⁸¹ See *id.* at 21–22.

⁸² See *id.*; Cohen & Lemley, *supra* note 2, at 24–25.

⁸³ See 35 U.S.C. § 112 (2006) (setting out the enablement and best mode requirements).

⁸⁴ See Cohen & Lemley, *supra* note 2, at 17–19.

⁸⁵ See 35 U.S.C. § 112 (2006).

⁸⁶ See *Fonar Corp. v. Gen. Elec. Co.*, 107 F.3d 1543, 1549 (1997).

⁸⁷ See *STOBBS*, *supra* note 37, § 2.06 (b)–(c).

⁸⁸ Thomas, *supra* note 1, at 234.

⁸⁹ See *Fonar*, 107 F.3d at 1548–49; see also Cohen & Lemley, *supra* note 2, at 24 n.87.

⁹⁰ See Fidel D. Nwamu, *Does Your Claim Conform to Means-Plus-Function Format Under Section 112, Paragraph Six?*, O.I. Corp. v. Tekmar Co., 6 J. INTELL. PROP. L. 189, 194–95 (1999).

⁹¹ See *id.*

criteria limits their efficacy.⁹² In programming, there are usually many different ways to accomplish a desired result.⁹³ Programmers may use different routines, approaches, and languages to accomplish the same programming task.⁹⁴ Different programmers will address a given problem in many—often significantly—different ways reflecting style, emphasis, priorities and skills.⁹⁵ Nonetheless, each of these programs produces the same result—or function—while employing a distinctly different means.⁹⁶ Requiring software claims to satisfy the means-plus-function test would mean that software patents would only be infringed when the source or machine code of the alleged infringing program is identical to the patented program.⁹⁷ The myriad ways to replicate the patented program's function without duplicating code would not be infringing.⁹⁸ Therefore, limiting software patents with a means-plus-function test would substantially reduce the value of patents meeting the means-plus-function standard.

The discussion in this section has identified some of the dilemmas software patents create. In particular, allowing limited software patent disclosure results in overly broad patent scope, which is anti-competitive.⁹⁹ Although excluding computer software from statutory subject matter would appear to address these problems, the European experience indicates that such a prohibition is extremely difficult to implement.¹⁰⁰ In the next section, we examine how U.S. courts have dealt with software patent claims and why the issue presents such a conundrum. The striking similarities between U.S. and European courts struggling with determining the patentability of software patent claims is particularly enlightening.

⁹² See *Fonar*, 107 F.3d at 1548–49 (discussing how source code is not sufficient to allow a software engineer to replicate the code because source code is machine-specific and it is more “important . . . to have a description of what the software has to do”).

⁹³ See KLEMENS, *supra* note 47, at 43.

⁹⁴ Thomas, *supra* note 1, at 235.

⁹⁵ See KLEMENS, *supra* note 47, at 43 (“In view of the astounding number of choices available in such an exercise, the two programmers’ solutions could be vastly different.”)

⁹⁶ *Id.*

⁹⁷ See Thomas, *supra* note 1, at 234–35.

⁹⁸ See *id.* at 235–36.

⁹⁹ See KLEMENS, *supra* note 47, at 73; Burk & Lemley, *supra* note 2, at 1688–89.

¹⁰⁰ See *infra* Parts III–IV.

II. U.S. JUDICIAL TREATMENT OF SOFTWARE PATENTS

A. *The Exclusion of Abstract Ideas From Statutory Subject Matter*

Whether software and business methods can be classified as statutory subject matter depends on the location of the boundaries of patent protection. The constitutional authorization for patents envisioned boundaries by granting Congress the power “[t]o promote the Progress of . . . Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.”¹⁰¹ Initial U.S. patent legislation identified statutory subject matter, but did not enumerate any subject-matter exclusions.¹⁰² The courts accepted the responsibility of defining the limits of patent protection.¹⁰³ They were cognizant of the dangers of allowing inventors to obtain overly expansive coverage of their claims and designed tests to curtail the scope of overreaching patent claims.¹⁰⁴ In particular, courts understood that allowing overly broad statutory subject matter could impede industrial innovation.¹⁰⁵ These tests precluded patent claims for abstract ideas, functions and effects, and mental steps,¹⁰⁶ and the exclusions lasted well into the twentieth century.¹⁰⁷ In 1972, the Supreme Court included “laws or principles of nature, mental processes, mathematical expressions and formulas, and abstract intellectual concepts” among excluded subject matter because “they are the basic tools of scientific and technological work.”¹⁰⁸

The primary policy objective behind the early judicial approach to statutory subject matter was to limit the anti-competitive impact of patents while maintaining innovation incentives.¹⁰⁹ Because granting exclusive rights is anti-competitive, the courts attempted to limit the subject area of patent coverage to technological-industrial innovations.¹¹⁰ Exclusive rights and the concomitant competitiveness losses are the

¹⁰¹ U.S. CONST. art. I, § 8, cl. 8.

¹⁰² See Patent Act of 1790, ch. 7, § 1 (1790) (identifying statutory subject matter as “any useful art, manufacture, engine, machine, or device, or any improvement therein not before known or used.”).

¹⁰³ See *Diamond v. Diehr*, 450 U.S. 175, 195–98 (1981) (Stevens, J., dissenting) (describing tests used to identify valid statutory subject matter).

¹⁰⁴ See *id.*

¹⁰⁵ See *LeRoy v. Tatham*, 55 U.S. 156, 175 (1852) (noting that excessive patent scope would retard innovation and development in a manner contrary to patent policy).

¹⁰⁶ See *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972).

¹⁰⁷ See *id.*

¹⁰⁸ *Id.*

¹⁰⁹ See *supra* notes 99–103 and accompanying text.

¹¹⁰ See *In re Musgrave*, 431 F.2d 882, 893 (C.C.P.A. 1970).

costs that society incurs in return for encouraging innovation in the useful arts and furthering rapid dissemination of new knowledge.¹¹¹ If the patent grant is overly expansive, however, the anti-competitive effects of granting exclusive rights impede innovation without significantly increasing the volume of knowledge in the public domain.

Early cases illustrate this judicial sensitivity. In 1852, the U.S. Supreme Court provided detailed rules and rationales for limited patent protection in *LeRoy v. Tatham* based on patent policy from the United States and England.¹¹² The Court, in correcting the trial court's jury instructions in a patent infringement case, enunciated policy principles that limited the scope of patent law.¹¹³ The trial court had instructed the jury that a patent claim for producing lead pipe should be validated regardless of whether the machine used was novel because the innovation consisted of "bringing a newly discovered principle into practical application."¹¹⁴ The Court stated as a foundational rule that inventors could not patent abstract principles and natural laws.¹¹⁵ To prevent inventors from overreaching with respect to abstract principles and laws of nature, the Court stated what has since been termed the means-plus-function test.¹¹⁶ In essence, an inventor could not obtain a patent on the result or effect of a process—in this case, the production of lead pipe by exploiting a particular property of lead—but could obtain exclusivity solely on the means by which the process achieved its effect.¹¹⁷ The Court reasoned that this limitation was needed to keep the abstract principle in the public domain.¹¹⁸ Allowing such exclusivity would discourage rather than promote advancement in the useful "arts and manufactures."¹¹⁹

¹¹¹ See Dan L. Burk, *The Role of Patent Law in Knowledge Codification*, 23 BERKELEY TECH. L.J. 1009, 1010 (2008) ("The rationale for patenting long favored in judicial opinion is the 'quid pro quo' theory: that patents are a bargain of sorts, between the inventor and the public, exchanging public disclosure of the claimed invention in return for the grant of a period of exclusive rights.").

¹¹² See *Leroy*, 55 U.S. at 175–76.

¹¹³ See *id.*

¹¹⁴ *Id.*

¹¹⁵ See *id.* at 174–75.

¹¹⁶ See *id.* at 175; see also *Corning v. Burden*, 56 U.S. 252, 268 (1853) ("[I]t is well settled that a man cannot have a patent for the function or abstract effect of a machine, but only for the machine which produces it.").

¹¹⁷ *LeRoy*, 55 U.S. at 175–76.

¹¹⁸ *Id.* at 175.

¹¹⁹ *Id.*

The ruling in *LeRoy* was not unanimous.¹²⁰ In a strong dissent, three justices argued that inventors who discover a way to exploit a natural law for a particular purpose should be entitled to exclusivity over all uses of the natural law to achieve the useful outcome.¹²¹ The dissent argued that the true innovation was in recognizing the application of the natural principle for a useful purpose, and thus, limiting exclusivity to the method or mode was contrary to patent policy.¹²² The implicit assumption in the dissent was that inventors should be rewarded for their ingenuity. The majority opinion's limitation of exclusivity provided inadequate incentives or rewards.¹²³ The dissenting opinion also dismissed the majority's concern about social welfare losses, arguing that exclusivity would be limited both in scope and term.¹²⁴ Inventors would be free to use the abstract principle for any other function, and inventors could use the principle for any function at the conclusion of the patent term.¹²⁵ Thus, according to the dissenting opinion, welfare losses would not be significant.

Despite the *LeRoy* dissent's argument for broader patent scope, subsequent courts adopted the more restrictive subject-matter requirements of the *LeRoy* majority. The 1853 Supreme Court case *O'Reilly v. Morse* exemplified this trend.¹²⁶ The Court in *O'Reilly* was particularly concerned with the over-expansive nature of claims based on abstract ideas.¹²⁷ Henry O'Reilly challenged the validity of patents held by Samuel Morse on the invention and improvement of telegraph technology.¹²⁸ The specific patent in question contained eight claims, the eighth of which was the subject of the controversy.¹²⁹ Morse claimed as follows:

Eighth. I do not propose to limit myself to the specific machinery, or parts of machinery, described in the foregoing specifications and claims; the essence of my invention being the use of the motive power of the electric or galvanic current, which I call electro-magnetism, however developed, for

¹²⁰ See *id.* at 177.

¹²¹ *Id.* at 187.

¹²² *Id.*

¹²³ See *LeRoy*, 55 U.S. at 187.

¹²⁴ See *id.*

¹²⁵ *Id.*

¹²⁶ See *O'Reilly v. Morse*, 56 U.S. 62 *passim* (1853).

¹²⁷ See *id.* at 135.

¹²⁸ See *id.* at 63–65.

¹²⁹ See *id.* at 85–86.

making or printing intelligible characters, letters, or signs, at any distances, being a new application of that power, of which I claim to be the first inventor or discoverer.¹³⁰

The Court invalidated the claim due to its excessive breadth.¹³¹ The Court reasoned that validating the claim would mean that “it matters not by what process or machinery the result is accomplished.”¹³² Morse would nonetheless have the exclusive right to that new invention or improvement. The Court, identifying social welfare-reducing implications of granting Morse exclusivity, stated that a competitor’s improved “invention may be less complicated—less liable to get out of order—less expensive in construction, and in its operation. But yet if it is covered by this patent the inventor could not use it nor the public have the benefit of it without [Morse’s permission].”¹³³ Therefore, if the Court had granted Morse such broad exclusive rights, other inventors would have no incentive to conduct research in this area because the Morse patent would prevent the inventor from exploiting and profiting from the broad invention without Morse’s permission.¹³⁴ Thus, unless Morse had the capability and willingness to duplicate the efforts of such inventors, there would likely be less innovation in the field of the Morse patent for the duration of the patent term, leaving society worse off.¹³⁵

Additional social welfare losses result from broad patent scope. As the *O’Reilly* Court noted, not only would it have a chilling effect on competing inventors, but a patent grant for Morse’s eighth claim would reduce the flow of knowledge into the public domain.¹³⁶ Morse would be free to improve and advance the subject matter of the patent without revealing such advancements to society. He would “need place no description of the new manner, process, or machinery, upon the records of the patent office.”¹³⁷ Moreover, at the end of the patent term, “the public must apply to [Morse] to learn what it is.”¹³⁸ Therefore, validating the expansive eighth claim could provide Morse with both patent protection during the patent term and trade secret protection at patent expiration. This result, while benefiting Morse greatly, would

¹³⁰ *Id.* at 86.

¹³¹ *Id.* at 113.

¹³² *O’Reilly*, 56 U.S. at 113.

¹³³ *Id.*

¹³⁴ *Id.*

¹³⁵ *See id.*

¹³⁶ *See id.*

¹³⁷ *Id.*

¹³⁸ *O’Reilly*, 56 U.S. at 113.

leave society with no gain from incurring the costs of granting Morse exclusivity in this industrial area.¹³⁹

In 1876, the Supreme Court revisited the question of identifying the boundaries of patentable subject matter in *Cochrane v. Deener*.¹⁴⁰ *Cochrane* remains relevant because of its characterization of patent processes. In the case, claimant Cochrane had multiple patents on a process and machinery to produce refined flour.¹⁴¹ His process patent claim covered the entire process of grinding and filtering flour with the use of air current to remove impurities.¹⁴² Similar to Morse's broad process claim,¹⁴³ Cochrane did not limit his claim to any particular machine. He claimed priority for any process employing the collective elements of his claim to refine flour.¹⁴⁴ The defendant had an improved method of refining flour that used a different type of machinery to effectuate the same function.¹⁴⁵ The defendant believed that this difference was sufficient to avoid infringement.¹⁴⁶ Unlike *O'Reilly*, however, the Court did not conclude that Cochrane's claim was overly broad.¹⁴⁷ In ruling that the defendant's method was infringing, the Court concluded that any alternative process that duplicated the steps of the patented process would infringe that patent regardless of whether the steps were accomplished in a different manner.¹⁴⁸ The particular method used to accomplish the function was irrelevant.¹⁴⁹ This conclusion encouraged broad patent claims in its aftermath. Nevertheless, if a claim was too broadly drawn, the *O'Reilly* ruling would disqualify the claim from statutory subject matter.¹⁵⁰

The *Cochrane* Court addressed the patent scope concern by providing a narrow definition of patent processes. The Court reasoned as follows: "[A] process is a mode of treatment of certain materials to produce a given result. It is an act, or a series of acts, performed upon the subject matter to be transformed and reduced to a different state or thing."¹⁵¹ Under this reasoning, a claim would describe a patent qualify-

¹³⁹ See *id.*

¹⁴⁰ *Cochrane v. Deener*, 94 U.S. 780, 786–88 (1876).

¹⁴¹ *Id.* at 781–85.

¹⁴² *Id.* at 785.

¹⁴³ *O'Reilly*, 56 U.S. at 85–86.

¹⁴⁴ *Cochrane*, 94 U.S. at 784–86.

¹⁴⁵ *Id.* at 785–86.

¹⁴⁶ *Id.* at 786.

¹⁴⁷ See *id.* at 787–88.

¹⁴⁸ *Id.* at 788.

¹⁴⁹ See *id.*

¹⁵⁰ See *O'Reilly*, 56 U.S. at 113.

¹⁵¹ *Cochrane*, 94 U.S. at 788.

ing process so long as the claim was sufficiently detailed to describe a series of steps or actions taken to physically transform a material object to a different state or thing.¹⁵² Abstract ideas and mental processes would not satisfy this test, nor would computer programs that were not part of some larger process.¹⁵³ Thus, the *Cochrane* physical transformation test provided a safe harbor for claims that might be subject to challenge for being abstract or overly broad.

For some time, the *Cochrane* process definition limited the scope of process patent claims.¹⁵⁴ Interestingly, at least one recent commentator has dismissed this interpretation of *Cochrane* as relying on incorrect dicta.¹⁵⁵ The basis for such criticism, however, appears to stem solely from the fact that contemporary federal court decisions have rejected the *Cochrane* physical transformation test.¹⁵⁶ An alternative view is that the courts have adopted a policy mandate to limit the scope of statutory subject matter due to the anti-competitive nature of patents.¹⁵⁷ Thus, limiting statutory subject matter to the types of inventions Congress conceived of when enacting the first patent act would be consistent both with this policy objective and congressional intent.¹⁵⁸ The physical transformation test furthers this objective by limiting patent protection to industrial and manufacturing innovations.¹⁵⁹ Whereas the test is flexible enough to accommodate new types of innovations within established categories, it does not allow protection for innovation in different or new categories of innovation such as business methods or computer software. Arguably, expansion of patent protection to new categories of innovation is in the sole domain of Congress.¹⁶⁰ Thus, limiting the spread of patent protection is more emblematic of judicial

¹⁵² See *id.*

¹⁵³ See, e.g., *Diehr*, 450 U.S. at 191–93 (ruling that a process patent that contained a mathematical algorithm as its sole novel element was valid subject matter because it was part of an industrial process for creating artificial rubber molds).

¹⁵⁴ See Samuelson, *supra* note 47, at 1037–38; Katharine P. Ambrose, Comment, *The Mental Steps Doctrine*, 48 TENN. L. REV. 903, 907–08 (1981).

¹⁵⁵ See Ambrose, *supra* note 154, at 907–08 (“[C]ourts interpreted dicta in the landmark case of *Cochrane v. Deener* to mean that patentable processes must operate on physical substances, and the courts therefore denied patents to methods requiring only the use of the human mind and writing implements.”) (citations omitted).

¹⁵⁶ See *id.*

¹⁵⁷ See Thomas & DiMatteo, *supra* note 1, at 6.

¹⁵⁸ See *id.* at 6–9.

¹⁵⁹ See *Diehr*, 450 U.S. at 188–93; *Cochrane*, 94 U.S. at 787–89; see also Thomas, *supra* note 1, at 193–97.

¹⁶⁰ See U.S. CONST. art. I, § 8, cl. 8. But see Thomas, *supra* note 1, at 194.

restraint than allowing the unfettered expansion of statutory subject matter that has occurred in recent decades.

The judicial policy of constraining statutory subject matter continued in the twentieth century. Until recent decades, patent claims that consisted of steps that take place in the human mind or require human intervention were excluded from statutory subject matter.¹⁶¹ “Mental steps jurisprudence,” which developed in a series of cases over several decades, construed valid subject matter as excluding claims that require human calculation, measurement, and interpretation.¹⁶² In 1951, the Court of Appeals in *In re Abrams* delineated the rules for applying the mental steps doctrine.¹⁶³ The case identifies three possibilities: first, all steps of a process claim are mental; second, the claim consists of both mental and non-mental steps but the novelty lies entirely in the mental steps; and third, a mixed claim for which the novelty resides in non-mental steps and the mental steps are incidental parts of the process but are needed to limit or define the claim.¹⁶⁴ Under the doctrine, only claims that fall in the third category qualify as statutory subject matter.¹⁶⁵

B. *The United States Supreme Court’s Cautionary Approach to Software Patents*

The U.S. Congress has assiduously avoided addressing whether computer software is patentable, thereby leaving the judicial system to shape policy.¹⁶⁶ With the rapid development of computer technology, the Supreme Court first considered the subject-matter question in 1972 in *Gottschalk v. Benson*.¹⁶⁷ The claim considered was for a “method for converting binary-coded decimal (BCD) numerals into pure binary numerals.”¹⁶⁸ This sweeping method was not tied to any particular machine or programming language. In fact, the claim method could be performed mentally or on paper without a computer.¹⁶⁹ As a result, it was easy for the Supreme Court to dispose of the claim because it was

¹⁶¹ See Ambrose, *supra* note 154, at 903; Cotter, *supra* note 60, at 860–61; Samuelson, *supra* note 47, at 1037.

¹⁶² See Samuelson, *supra* note 47, at 1034.

¹⁶³ See 188 F.2d 165, 166 (C.C.P.A. 1951).

¹⁶⁴ See *id.*

¹⁶⁵ See *id.*

¹⁶⁶ See *Benson*, 409 U.S. at 73 (noting that “considerable problems are raised which only committees of Congress can manage, for broad powers of investigation are needed, including hearings which canvass the wide variety of views which those operating in this field entertain.”).

¹⁶⁷ *Id.* at 64.

¹⁶⁸ *Id.*

¹⁶⁹ See *id.* at 66–67.

“so abstract and sweeping as to cover both known and unknown uses of the BCD to pure binary conversion.”¹⁷⁰

Although disposal of the BCD claim was straightforward, the Court was concerned about whether its opinion would be interpreted as standing for the proposition that computer software could never be patented. The Court stated that “[w]e do not hold that no process patent could ever qualify if it did not meet the requirements of our prior precedents,” and “[we do not hold] that the [*Benson*] decision precludes a patent for any program servicing a computer.”¹⁷¹ Nevertheless, the Court, observing that “pure” software patent claims had previously been denied, noted that there existed considerable practical confusion in dealing with some software patent claims camouflaged as “a process, or a machine or components thereof . . . rather than as a program itself.”¹⁷² In other words, whether or not Congress chose to extend statutory subject matter to cover pure software programs, congressional action was still required to give the USPTO and courts guidance on how to handle hybrid claims.¹⁷³

The Court was clearly uncomfortable with accepting the reins of policy makers. Rather than give the public guidance as to how to treat patent claims, the *Benson* Court issued an impassioned plea for Congress to accept its responsibilities to develop patent policy in the legislative forum.¹⁷⁴ Thus, while identifying its machine or physical transformation test as the relevant precedent,¹⁷⁵ *Benson* emphatically refused to assert that the test applies to all software patent claims.¹⁷⁶ The Court intentionally left the decision ambiguous in the hopes of eventual congressional intervention.

With the failure of Congress to accept the Court’s invitation to take action, the Supreme Court issued its second ruling on software patentability. In 1977, in *Parker v. Flook*,¹⁷⁷ the Court considered a process claim that calculated an alarm limit. In certain industrial applications, operators—whether human or machines—need to receive notifi-

¹⁷⁰ *Id.* at 68.

¹⁷¹ *Id.* at 71.

¹⁷² *Benson*, 409 U.S. at 72.

¹⁷³ *See id.* at 73.

¹⁷⁴ *See id.*

¹⁷⁵ *See id.* at 70 (“Transformation and reduction of an article ‘to a different state or thing’ is the clue to the patentability of a process claim that does not include particular machines.”).

¹⁷⁶ *See id.* at 71 (“We do not hold that no process patent could ever qualify if it did not meet the requirements of our prior precedents.”).

¹⁷⁷ *See Parker v. Flook*, 437 U.S. 584, 585 (1977).

cation when certain process variables reach or exceed a designated threshold—the alarm limit—in order to make adjustments to maintain efficiency or to avoid dangerous conditions.¹⁷⁸ The *Flook* claim, although machine independent, provided a method for continually adjusting the alarm rate based on changes in process variables.¹⁷⁹ The only novel element of the process was the use of an algorithm for calculating alarm rates.¹⁸⁰

In rejecting the patentability of the *Flook* claim, the Court did not directly consider whether computer software per se is patentable. The Court, acknowledging in a footnote that one could argue that Supreme Court precedent requires processes to change materials to a “different state or thing,” refused to apply those precedents to the *Flook* claim.¹⁸¹ Moreover, the Court left open the question of whether it considered software as part of the category of unpatentable algorithms. Instead, the Court’s new test basically required examiners to remove the algorithm from consideration before evaluating the patentability of the claim.¹⁸² Under this test, courts and examiners must first consider the algorithm “well known” in the prior art to avoid biasing the overall evaluation of the claim.¹⁸³ Then, subject to this constraint, the reviewer must determine whether the process claim as a whole is new and useful.¹⁸⁴

The respondent argued that this treatment conflated the Section 102 and 103 novelty and usefulness requirements with the Section 101 subject-matter determination.¹⁸⁵ The Court deflected this claim by observing that certain discoveries such as laws of nature are outside what Congress intended to protect.¹⁸⁶ Therefore, courts must refuse to allow patentability to be determined solely by non-patentable subject matter.¹⁸⁷ Whereas inclusion of a law of nature or algorithm does not by itself disqualify a claim from patent protection, neither can it be the sole factor that is new and non-obvious.

In *Flook* the Supreme Court attempted to create limits for software-based creations without violating its self-imposed constraint of not rul-

¹⁷⁸ *See id.*

¹⁷⁹ *See id.* at 585–86.

¹⁸⁰ *See id.*

¹⁸¹ *See id.* at 588 n.9, 594.

¹⁸² *See id.* at 591–92.

¹⁸³ *See Flook*, 437 U.S. at 591–92.

¹⁸⁴ *See id.* at 591.

¹⁸⁵ *See id.* at 592.

¹⁸⁶ *See id.* at 593.

¹⁸⁷ *See id.*

ing on the patentability of computer software.¹⁸⁸ The Court's ruling, that any software that could be classified as an algorithm could not provide the claim element that met patentability requirements, provided a bulwark against clever claim drafters getting patents that would be rejected if framed differently.¹⁸⁹ Nevertheless, this approach increased rather than reduced ambiguity. Without defining "algorithm," it was unclear whether the term encompassed all computer programs or just a subset.¹⁹⁰ Nonetheless, *Flook* was successful in putting limits, albeit for a short time, on the scope of patentable process claims.¹⁹¹

The Supreme Court quickly rejected the *Flook* constraints in 1981 in *Diamond v. Diehr*.¹⁹² The *Diehr* process claim consisted of "a process for molding raw, uncured synthetic rubber into cured precision products."¹⁹³ The contribution of this claim was the ability to measure the temperature of the rubber inside the press continually, and to recalculate the Arrhenius equation based on this data in order to determine the precise time to complete the curing process.¹⁹⁴ Applying the *Flook* test to this claim required evaluating the artificial rubber-curing process under the assumption that the non-patentable Arrhenius equation was well known in the art.¹⁹⁵ Employing this approach in his dissenting opinion, Justice Stevens concluded that the claim contained no innovation other than the continual monitoring of the process, and was thus not statutory subject matter.¹⁹⁶

The majority of the Supreme Court rejected this analysis based, ironically, on an application of the machine-or-physical-transformation test.¹⁹⁷ The Court reconciled *Benson* and *Flook* by characterizing those claims as attempts to obtain patents on mathematical formulae.¹⁹⁸ It distinguished the *Diehr* claim as a more efficient method for curing rubber, an industrial process of the type that patents were designed to

¹⁸⁸ See *id.* at 595.

¹⁸⁹ See *Flook*, 437 U.S. at 590.

¹⁹⁰ See *Diehr*, 450 U.S. at 219 (Stevens, J., dissenting) (explaining how "the inclusion of the ambiguous concept of an 'algorithm' within the 'law of nature' category of unpatentable subject matter has given rise to the concern that almost any process might be so described and therefore held unpatentable").

¹⁹¹ Compare *Flook*, 437 U.S. at 591–94, with *Diehr*, 450 U.S. at 192 (rejecting the constraints in *Flook*).

¹⁹² *Diehr*, 450 U.S. at 192.

¹⁹³ *Id.* at 175.

¹⁹⁴ *Id.* at 178–79.

¹⁹⁵ See *id.* at 208–09 (Stevens, J., dissenting).

¹⁹⁶ See *id.* at 209.

¹⁹⁷ See *id.* at 192 (majority opinion).

¹⁹⁸ *Diehr*, 450 U.S. at 185–87.

protect.¹⁹⁹ Critical to the Court's analysis was that this process, considered in its entirety, transformed the state of a substance.²⁰⁰ The Court refused to use physical transformation as a necessary condition for patentability, but did recognize it as a sufficient condition to satisfy the subject-matter requirement.²⁰¹

Most significantly, the Court rejected the *Flook* approach of not allowing patents for which a non-patentable algorithm was the sole source of innovation.²⁰² This reversal made it significantly easier for patent lawyers to draft valid patent claims that were faster or more efficient than—but the same in all other respects as—existing technology.²⁰³ In a passionate dissent, Justice Stevens, joined by Justices Brennan, Marshall, and Blackmun, castigated the majority opinion for increasing uncertainty and ambiguity in the treatment of patent claims containing computer programs and mathematical algorithms.²⁰⁴ Of even greater importance, however, was the *Diehr* dissent's argument that the majority opinion eviscerated the holdings in *Benson* and *Flook* as well as “the settled line of authority reviewed in those opinions.”²⁰⁵ Whereas the Supreme Court in *Benson* and *Flook* attempted to provide some limits to the patentability of software, the dissenting justices in *Diehr* argued that the majority's approach essentially opened the floodgates to software patents.

Specifically, the dissenting justices saw little substantive difference between the alarm-limits patent claim invalidated in *Flook* and the rubber-curing patent in *Diehr*.²⁰⁶ None of the process steps or components were unusual except the application of the Arrhenius algorithm to temperature readings in order to choose an optimal time to end the curing process.²⁰⁷ The novelty in this process consisted solely of “updating the original estimated curing time by repetitively recalculating that time pursuant to a well-known mathematical formula in response to variations in temperature within the mold.”²⁰⁸ The only noticeable dif-

¹⁹⁹ See *id.* at 184.

²⁰⁰ See *id.* at 192.

²⁰¹ See *id.*

²⁰² See *id.* at 185–88.

²⁰³ See *id.* at 187–88.

²⁰⁴ See *Diehr*, 450 U.S. at 193 (majority opinion), 219 (Stevens, J., dissenting).

²⁰⁵ *Id.* at 205 (Stevens, J., dissenting).

²⁰⁶ *Id.* at 209 (“Their method of updating the curing time calculation is strikingly reminiscent of the method of updating alarm limits that Dale Flook sought to patent.”).

²⁰⁷ *Id.* at 208 (“There is no suggestion that there is anything novel in the instrumentation of the mold, in actuating a timer when the press is closed, or in automatically opening the press when the computed time expires.”).

²⁰⁸ *Id.* at 209.

ference between this process and the alarms limit process in *Flook* is that the *Diehr* process automatically opened the rubber mold once designated conditions were made, whereas the alarms limit process claim did not include automatically setting off an alarm.²⁰⁹

It is hard to reconcile the different results in *Flook* and *Diehr* given the strong similarity between the two cases. *Flook* stood for the proposition that adding insignificant post-solution activity was insufficient to make a mathematical algorithm patentable.²¹⁰ Yet it is difficult to rationalize *Diehr*'s implicit conclusion that signaling the opening of a rubber mold after obtaining the solution of a mathematic algorithm does constitute a significant post-solution action.²¹¹ The use of the Arrhenius algorithm in an unequivocal industrial process clearly influenced the *Diehr* Court.²¹² But perhaps the similar post-solution action of generating a signal in both cases makes the industrial application a distinction without substance.²¹³ With the *Diehr* Court's "entire process" approach it appeared easier to get patent approval for an algorithm embedded in a useful process.²¹⁴ The most significant constraint was that the claim could not encompass all uses of the algorithm.²¹⁵ Nevertheless, if a particular industry, such as rubber manufacturing, relies on a particular algorithm, this constraint does not prevent an inventor from preempting the automatic or computerized use of the equation as happened in *Diehr*.²¹⁶ Thus, the *Diehr* decision opened the door to broad patent claims that relied on algorithms.

The final, oft-cited Supreme Court patent subject matter case of the twentieth century had nothing to do with computer algorithms or process claims. Nevertheless, the 1980 Supreme Court case *Diamond v. Chakrabarty*²¹⁷ is sometimes misquoted as standing for the proposition that U.S. patent law holds no boundaries for human inventiveness.²¹⁸ The defendant, Chakrabarty, invented a micro-organism that consumed

²⁰⁹ Cf. *Flook*, 437 U.S. at 585–86.

²¹⁰ See *id.* at 590.

²¹¹ See *Diehr*, 450 U.S. at 184.

²¹² See *id.* at 185–88.

²¹³ See *id.* at 184; *Flook*, 437 U.S. at 594–95.

²¹⁴ See *Diehr*, 450 U.S. at 188–89.

²¹⁵ See *id.* at 188; see also *Benson*, 409 U.S. at 71–73.

²¹⁶ See *Diehr*, 450 U.S. at 191–93.

²¹⁷ *Diamond v. Chakrabarty*, 447 U.S. 303 (1980).

²¹⁸ See, e.g., *State St. Bank & Trust Co. v. Signature Fin. Grp. Inc.*, 149 F.3d 1368, 1373 (Fed. Cir. 1998) ("Indeed, the Supreme Court has acknowledged that Congress intended § 101 to extend to 'anything under the sun that is made by man.'" (quoting *Chakrabarty*, 447 U.S. at 309)).

crude oil, a trait that presumably would be useful in oil spill cleanups.²¹⁹ The issue was whether or not a micro-organism was disqualified from statutory subject matter because it is a life form; or, alternatively, whether it qualified as statutory subject matter as either a manufacture or as a composition of matter.²²⁰ The Supreme Court reasoned that the micro-organism, although a life form, was not a product of nature but rather a creation of man, and as such, was statutory subject matter.²²¹ The Supreme Court cited Committee Reports published in connection with the adoption of the 1952 Patent Act, which indicated that Congress intended statutory subject matter to “include anything under the sun that is made by man.”²²²

Although the language is sweeping, the context of the Court’s quote makes it clear that the Court did not intend to apply the language to computer software. The *Chakrabarty* Court clearly stated that statutory subject-matter scope is not unlimited.²²³ Citing their *Flook* decision, the Court reiterated that laws of nature, physical phenomena, and abstract ideas are excluded from statutory subject matter.²²⁴ It is quite telling that the Court cited *Flook* as the most recent authority for these limitations.²²⁵ There is no contradiction between the two cases. Both cases purported to deal with new, unforeseen categories of creation: computer programs in *Flook*²²⁶ and man-made organisms in *Chakrabarty*.²²⁷ Although specific details may have been unforeseen, existing categories covered each of these claims. The Court classified the *Flook* computer program as a mathematical algorithm—an abstract idea²²⁸—and the *Chakrabarty* micro-organism was either a manufacture or composition of matter.²²⁹ Thus, the claims’ classifications—either a process or a manufacture or composition of matter—dictated the respective claims’ treatments. A manufacture or composition of matter claim is clearly valid patent subject matter even if the invention had never been anticipated.²³⁰ Process claims,

²¹⁹ *Chakrabarty*, 447 U.S. at 305.

²²⁰ *See id.* at 307.

²²¹ *See id.* at 309–10.

²²² *See id.* at 309.

²²³ *See id.* (“This is not to suggest that § 101 has no limits or that it embraces every discovery.”).

²²⁴ *See id.*

²²⁵ *See Chakrabarty*, 447 U.S. at 309.

²²⁶ *See Flook*, 437 U.S. at 585–86.

²²⁷ *See Chakrabarty*, 447 U.S. at 305.

²²⁸ *See Flook*, 437 U.S. at 594–96.

²²⁹ *See Chakrabarty*, 447 U.S. at 309–10.

²³⁰ *See id.*

however, were subject to the more limited treatment described in the Supreme Court's *Benson-Flook-Diehr* line of cases.

C. Federal Court Treatment of Computer Software

Federal courts' expansive treatment of computer and software patents in the computer age contrasts strikingly with the Supreme Court's cautionary approach.²³¹ Prior to the 1960s, the U.S. judiciary was consistent in limiting the scope of statutory subject matter.²³² Nonetheless, the United States Court of Patent Appeals (CCPA) and its successor, the CAFC, delivered a series of decisions that rapidly removed the set of limitations that various courts adopted and followed during the nineteenth century and most of the twentieth century.²³³ The change can be attributed to a different interpretation of the policy basis behind the Patent Act. With respect to software, courts had interpreted Section 101 narrowly prior to the 1960s.²³⁴ Courts interpreted "useful arts" to include processes that were "technological" in nature.²³⁵ Federal courts did not question prohibitions against abstract ideas and laws of nature because the potential for such patents to deter progress was clear.²³⁶ By contrast, the policy bases for other statutory subject-matter exclusions, such as the mental steps exclusion, were rather opaque.²³⁷ Consequently, starting in the 1960s, federal courts—perhaps adopting a more expansive view of statutory subject matter, or perhaps demanding

²³¹ See *Diehr*, 450 U.S. at 205 (Stevens, J., dissenting) (describing the approach of the Court of Customs and Patent Appeals to Section 101 statutory subject matter questions as "expansive"); *In re Musgrave*, 431 F.2d at 893–94 (Baldwin, J., concurring) (describing the majority opinion's rejection of well-established subject matter limits as "radical").

²³² See *Diehr*, 450 U.S. at 195 (Stevens, J., dissenting) (observing that, "[p]rior to 1968, well-established principles of patent law probably would have prevented the issuance of a valid patent on almost any conceivable computer program").

²³³ See *id.*

²³⁴ *Id.*

²³⁵ See Samuelson, *supra* note 47, at 1112 (quoting professor D. Chisum as stating "the general purpose of the statutory classes of subject matter is to *limit* patent protection to the field of applied technology, what the U.S. Constitution calls the 'useful arts,'" and also quoting professor Chisum as noting that as practical and useful as they may be, "discoveries . . . in nontechnological arts, such as the liberal arts, the social sciences, theoretical mathematics, and business and management methodology" are not patentable).

²³⁶ See *Benson*, 409 U.S. at 67 (discussing how abstract ideas and laws of nature are excluded from statutory subject matter because "they are the basic tools of scientific and technological work"); *LeRoy*, 55 U.S. at 175 ("A principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right.").

²³⁷ See, e.g., Ambrose, *supra* note 154, at 911.

greater rigor in shaping decisions—reviewed such exclusions critically and rejected them for lacking legislative support.

One of the first rules to fall under this enhanced level of scrutiny was the mental steps exclusion. In 1968, in *In re Prater*, the CCPA considered a claim rejection based on *In re Abrams*' "three rules" for dealing with mental steps.²³⁸ The court noted that the defense attorney's brief proposed the three rules and that the *Abrams* court had never adopted the three rules for testing claims containing mental steps.²³⁹ The court continued by dismissing the *Cochrane* physical transformation test as dicta.²⁴⁰ This decision and the CCPA's reaffirmation of its reasoning in its rehearing of *In re Prater*, put into question the continued viability of the mental steps exclusion.

In 1970, in *In re Musgrave*, the CCPA answered this question by rejecting the mental steps doctrine and its point of novelty approach.²⁴¹ The CCPA reiterated its rejection of the *Abrams* mental steps rules.²⁴² The CCPA continued by specifically rejecting the "point of novelty" analysis incorporated in the *Abrams* rule as "logically unsound."²⁴³ This rejection was particularly noteworthy because the Supreme Court in *Flook* had recently employed a point of novelty analysis in rejecting a patent claim containing an algorithm.²⁴⁴ In addition, the CCPA explicitly rejected mental steps as a statutory subject-matter exclusion.²⁴⁵ The CCPA reasoned that a claim that required subjective judgment would likely be rejected under other Patent Law provisions but would not be excluded from statutory subject-matter treatment.²⁴⁶

In dealing with claims that included algorithms, similar to those that the Supreme Court reviewed in *Flook* and *Diehr*,²⁴⁷ the federal courts found substantial leeway in shaping the law. In 1992, in *Arrhythmia Research Technology v. Corazonix Corp.*,²⁴⁸ the CAFC—the CCPA's successor court—faced the task of determining the validity of a mixed patent claim that was remarkably similar to the mixed claims in *Flook*.²⁴⁹

²³⁸ See *In re Prater*, 415 F.2d 1378, 1381, 1386 (C.C.P.A. 1968).

²³⁹ See *id.* at 1386.

²⁴⁰ See *id.* at 1388.

²⁴¹ See *In re Musgrave*, 431 F.2d at 886.

²⁴² See *id.* at 889.

²⁴³ *Id.*

²⁴⁴ See *Flook*, 437 U.S. at 594.

²⁴⁵ See *In re Musgrave*, 431 U.S. at 889, 893.

²⁴⁶ *Id.* at 893.

²⁴⁷ *Diehr*, 450 U.S. at 181, 185; *Flook*, 437 U.S. at 587.

²⁴⁸ 958 F.2d 1053, 1056, 1059–60 (Fed. Cir. 1992).

²⁴⁹ 437 U.S. at 585–86.

and *Diehr*.²⁵⁰ The patent claim at issue in *Arrhythmia Research* dealt with a medical problem related to heart attack victims, who are at high risk of suffering from ventricular tachycardia, a condition which can lead to a large diminution in the flow of blood from the heart.²⁵¹ Although drugs are effective in treating the condition, these drugs have serious side effects and optimally should be taken only when absolutely needed.²⁵² Based on well-known relationships between patients' electrocardiographic signals and heart conditions, treating physicians could identify patients who were at particularly high risk for ventricular tachycardia. Specifically, patients with certain anomalous wave characteristics in the ventricular contraction cycle—referred to as “late potentials”—were at high risk.²⁵³ The Stinson patent claim's innovation was its ability to filter and isolate late potentials present in electrocardiograph readings and set off an alarm if the late potentials exceeded a specified threshold.²⁵⁴ In summary, the invention consisted of reading electrocardiograph signals, converting the reading to a data format readable by a generic computer, and analyzing the data using mathematical algorithms for the presence of late potentials by comparing the value of analyzed data to a predetermined level.²⁵⁵

The *Arrhythmia Research* process claim was analogous to the alarms-rate process claim in *Flook* and the rubber-curing process claim in *Diehr*. In all three cases, the point of novelty resided entirely in the data-processing component of the claim.²⁵⁶ The electrocardiograph readings that indicate the presence of late potentials were well known, as were the threshold levels that warranted initiation of patient treatment.²⁵⁷ The novelty in the Stinson patent claim, then, was processing a noisy digital signal to produce a reading that provided a more accurate measure of the level of late potentials.²⁵⁸ Analogous to the *Flook* alarms-limit claim,²⁵⁹ the Stinson claim accepted input data, evaluated it using

²⁵⁰ 450 U.S. at 177–81.

²⁵¹ *Arrhythmia Research*, 958 F.2d at 1054.

²⁵² *See id.*

²⁵³ *Id.*

²⁵⁴ *Id.* at 1054–55.

²⁵⁵ *Id.* at 1055. The patent application also included an apparatus claim covering a device that performed the same functions.

²⁵⁶ *Diehr*, 450 U.S. at 205 (Stevens, J., dissenting); *Flook*, 437 U.S. at 585; *Arrhythmia Research*, 958 F.2d at 1058.

²⁵⁷ *Arrhythmia Research*, 958 F.2d at 1059.

²⁵⁸ *See id.* at 1058–59 (describing the process as “a method of detection of a certain heart condition by a novel method of analyzing a portion of the electrocardiographically measured heart cycle”).

²⁵⁹ *Flook*, 437 U.S. at 585–86.

mathematical algorithms and provided a reading of the target variable.²⁶⁰ Unlike the rubber-curing claim in *Diehr*, the Stinson process was not part of a traditional industrial process that produced a physical end product.²⁶¹ Thus, there was no significant difference between the Stinson process and algorithm-based process claims in *Benson* and *Flook* that the Supreme Court held were not statutory subject matter.²⁶²

Nonetheless, the CAFC held that the Stinson claim constituted statutory subject matter.²⁶³ In applying the physical transformation test, the CAFC erroneously concluded that the Stinson process transformed matter from one state to another.²⁶⁴ In referring to the electrocardiograph signals that provided input data for the analysis, the CAFC mistakenly asserted that such signals were not abstractions, but were “related to the patient’s heart function.”²⁶⁵ But such signals are absolutely abstractions. Although related to the patient’s heart function, these signals are simply a measure of that function, just as a digital thermometer measures temperature. Once translated into digital form, the electrocardiograph signal is much more akin to financial data in a spreadsheet than it is to the function of a patient’s heart. Just as the information in a spreadsheet provides an abstraction of financial information, the electrocardiograph signal provides an abstract representation of the patient’s heart function.²⁶⁶ The CAFC also concluded that manipulation of electrical signals satisfied the physical transformation test.²⁶⁷ Thus, according to the CAFC, the act of converting readings from a measuring device into a form that a generic digital computer could recognize also satisfies the physical transformation test.²⁶⁸

Judge Rader’s concurrence in *Arrhythmia Research* provided a somewhat prescient insight into the direction that the CAFC was headed. Rather than accept the tortured attempts of the *Arrhythmia Research*

²⁶⁰ *Arrhythmia Research*, 958 F.2d at 1058–59.

²⁶¹ Compare *id.* at 1059, with *Diehr*, 450 U.S. at 176–77.

²⁶² Compare *Arrhythmia Research*, 958 F.2d at 1059, with *Flook*, 437 U.S. at 594, and *Benson*, 409 U.S. at 72–73.

²⁶³ *Arrhythmia Research*, 958 F.2d at 1060.

²⁶⁴ See *id.* at 1059.

²⁶⁵ See *id.* The CAFC, in addressing the validity of the Stinson apparatus claim, bizarrely concluded that a number representing a measure of heart activity was not a mathematical abstraction because it provided an indication of the risk of ventricular tachycardia. See *id.* at 1060.

²⁶⁶ See *id.* at 1059.

²⁶⁷ See *id.* (“These claimed steps of ‘converting,’ ‘applying,’ ‘determining,’ and ‘comparing’ are physical process steps that transform one physical, electrical signal into another.”).

²⁶⁸ *Id.* at 1060.

majority to stretch the physical transformation test to cover the Stinson process, Judge Rader advocated dropping all subject-matter tests that had no statutory basis in Section 101 of the Patent Act.²⁶⁹ Judge Rader noted that most of the tests relied on “vague and malleable terms” such as “law of nature,” “natural phenomena,” “formulae,” or “algorithm.”²⁷⁰ He noted that “[w]hen attempting to enforce a legal standard embodied in broad, vague, non statutory terms, the courts have floundered.”²⁷¹ Judge Rader noted the specific difficulty courts had in interpreting and applying the prohibition against patenting mathematical algorithms.²⁷² He identified two 1982 CCPA cases that had dramatically different interpretations of that term.²⁷³ In *In re Pardo*, the CCPA narrowly defined mathematical algorithm,²⁷⁴ whereas in *In re Meyer*,²⁷⁵ the CCPA broadly defined mathematical algorithm, “to include any mental process that can be represented by a mathematical algorithm.”²⁷⁶ In any event, Judge Rader argued that *Diehr* had already jettisoned the mathematical algorithm exclusion, leaving laws of nature, natural phenomenon, and abstract ideas as the only non-statutory subject-matter exclusions.²⁷⁷ Therefore, courts should look to the plain meaning of Section 101 to determine valid statutory subject matter.²⁷⁸ The CAFC soon followed Judge Rader’s exhortation.²⁷⁹

In *In re Alappat*, the CAFC began moving towards the complete elimination of statutory subject-matter tests by jettisoning the Supreme Court’s physical-transformation test.²⁸⁰ The *In re Alappat* claim was a computer program that could run on any conventional digital computer, known as a rasterizer. A waveform data sequence provided the input, which the rasterizer processed and filtered to produce output data that was amenable to display on a cathode ray tube.²⁸¹ Consistent with Judge Rader’s concurrence in *Arrhythmia Research*, the CAFC reiterated that *Diehr* recognized laws of nature, natural phenomena, and ab-

²⁶⁹ See *Arrhythmia Research*, 958 F.2d at 1066 (Rader, J., concurring).

²⁷⁰ *Id.* at 1062–63.

²⁷¹ *Id.* at 1063.

²⁷² *Id.*

²⁷³ *Id.*

²⁷⁴ *Id.*; *In re Pardo*, 684 F.2d 912, 916–17 (C.C.P.A. 1982).

²⁷⁵ *In re Meyer*, 688 F.2d 789, 796 (C.C.P.A. 1982).

²⁷⁶ *Arrhythmia Research*, 958 F.2d at 1063.

²⁷⁷ *Id.* at 1066.

²⁷⁸ See *id.*

²⁷⁹ *AT&T Corp. v. Excel Commc’n, Inc.*, 172 F.3d 1352, 1359–61 (Fed. Cir. 1999).

²⁸⁰ See *In re Alappat*, 33 F.3d 1526, 1544 (Fed.Cir. 1994) (en banc).

²⁸¹ *Id.* at 1537.

stract ideas as the only exclusions from statutory subject matter.²⁸² The CAFC then concluded that a claim that includes software is non-statutory only to the extent that the claim as a whole “represent[s] nothing more than abstract ideas.”²⁸³ Thus, unless a claim was unequivocally a mathematical algorithm, it qualified as statutory subject matter.²⁸⁴ To satisfy this standard for statutory subject matter, the inventor need only show that the claim produced “a useful, concrete, and tangible result.”²⁸⁵ The rasterizer in *In re Alappat* clearly satisfied this standard.²⁸⁶

In re Alappat’s “useful, concrete and tangible” test removed all remaining ambiguity as to whether claims must satisfy the *Cochrane* physical transformation test to be considered statutory subject matter.²⁸⁷ Although the BCD claim in *Benson* would likely fail the useful, concrete and tangible test, the alarm-limits claim in *Flook* might satisfy the test based on *In re Alappat*’s broad definition of “concrete and tangible.”²⁸⁸ In addition, *In re Alappat* made it easier for clever claims drafters to frame software programs employed in conventional digital computers as machines.²⁸⁹ Drafting a claim as a machine rather than a process makes satisfying the concrete and tangible requirement trivial.

AT&T Corp. v. Excel Communications, Inc. and *State Street Bank & Trust Co. v. Signature Financial Group, Inc.* removed all remaining Section 101 impediments to software patents.²⁹⁰ The *State Street Bank* claim was a computerized accounting system used to allocate returns for mutual fund shareholders.²⁹¹ The *AT&T* patent identified a method for recording certain information about long-distance telephone callers that was useful for billing purposes.²⁹² These cases went a step beyond *Alappat* in that the subject patent claims consisted entirely of business applications.²⁹³ Prior to *State Street Bank*, it was generally accepted that meth-

²⁸² *Id.* at 1542.

²⁸³ *Id.* at 1543 (emphasis omitted).

²⁸⁴ *Id.* at 1544 (“[T]he proper inquiry . . . is to see whether the claimed subject matter as a whole is a disembodied mathematical concept . . . which in essence represents nothing more than a ‘law of nature,’ ‘natural phenomenon,’ or ‘abstract idea.’”) (emphasis omitted).

²⁸⁵ *Id.*

²⁸⁶ *In re Alappat*, 33 F.3d at 1544.

²⁸⁷ *Cochrane*, 94 U.S. at 787–88; see *In re Alappat*, 33 F.3d at 1544.

²⁸⁸ See *Flook*, 437 U.S. at 585–86, 591; *Benson*, 409 U.S. at 72; *In re Alappat*, 33 F.3d at 1544–45.

²⁸⁹ See *In re Alappat*, 33 F.3d at 1545.

²⁹⁰ See *AT&T*, 172 F.3d at 1359–61; *State St. Bank*, 149 F.3d at 1375–76.

²⁹¹ *State St. Bank*, 149 F.3d at 1370.

²⁹² *AT&T*, 172 F.3d at 1353.

²⁹³ See *id.*; *State St. Bank*, 149 F.3d at 1370.

ods for conducting business were not valid subject matter for patents: this exclusion was known as the business method exception. *State Street Bank* rejected the business method exception, reasoning that reliance on Section 101 and patent law in general are sufficient to evaluate such claims.²⁹⁴ Instead, *State Street Bank* employed *In re Alappat*'s useful, concrete and tangible result test to evaluate the mutual fund accounting method as constituting statutory subject matter.²⁹⁵

AT&T explicitly extinguished *Diehr*'s physical-transformation test. Excel Corporation based its defense to AT&T's infringement claim on the patent's failure to effect a physical transformation.²⁹⁶ Ignoring the physical transformation discussion in *Diehr*,²⁹⁷ the CAFC instead focused on the use of the term "e.g." in *Diehr* to infer that physical transformation was only one of multiple ways software could satisfy Section 101 statutory subject-matter requirements.²⁹⁸ The court then proclaimed that the useful, concrete and tangible result test had supplanted the physical-transformation test, stating "[w]hatever may be left of the earlier test, if anything, this type of physical limitations analysis seems of little value."²⁹⁹ Thus, software and business methods no longer receive special statutory subject-matter scrutiny. Any software claim drafted in terms of a process, machine, manufacture, or composition of matter may overcome the Section 101 hurdle.³⁰⁰

Support for the CAFC's expansion of statutory subject matter was not universal.³⁰¹ Whereas Congress and the Supreme Court stayed on the sidelines, the United States Board of Patent Appeals (BPA) attempted to reign in patent coverage of business method patents. In 2001 in *Ex parte Bowman*, the BPA considered an invention that claimed a "method of evaluating an intangible asset of interest."³⁰² A representative claim consisted of choosing relevant variables, plotting the variables on a two-dimensional chart and then using the chart to ascertain the

²⁹⁴ *State St. Bank*, 149 F.3d at 1375–76.

²⁹⁵ *Id.*

²⁹⁶ *AT&T*, 172 F.3d at 1358.

²⁹⁷ *Diehr*, 450 U.S. at 182–84.

²⁹⁸ *AT&T*, 172 F.3d at 1358–59.

²⁹⁹ *Id.* at 1359.

³⁰⁰ *Id.* at 1359–61.

³⁰¹ See Kevin M. Baird, *Business Method Patents: Chaos at the USPTO or Business as Usual?*, 2001 U. ILL. J.L. TECH. & POL'Y 347, 358 (discussing the "Business Method Patent Improvement Act of 2000," a congressional bill proposing changes to current patent prosecution procedures when dealing with business method patents); Thomas & DiMatteo, *supra* note 1, at 8–9 (2007) (describing failed efforts by legislators to limit the patentability of business method and software patents).

³⁰² *Ex parte Bowman*, No. 1999-0583, 2001 WL 1646047, at *1 (B.P.A.I. June 12, 2001).

value of the asset.³⁰³ Although it might appear that such an invention would be subject to a Section 112 challenge for being vague, the BPA ruled that the Bowman claims met the Section 112 disclosure requirement.³⁰⁴ Instead, the BPA rejected the Bowman claims because the invention was not tied to any technological art and therefore “is nothing more than an abstract idea.”³⁰⁵ The BPA opined that the term “technological arts” was synonymous with the term “useful arts” that appears in the Patent Clause of the Constitution.³⁰⁶

The technological arts requirement did not last. In 2005, in *Ex parte Lundgren*, the BPA, in determining whether “a method of compensating a manager” is statutory subject matter, considered applying two tests: the technological arts test and the “useful, concrete and tangible” test.³⁰⁷ The BPA rejected the technological arts requirement, noting that *Ex parte Bowman* lacked precedential value, and the Board found no valid support for the requirement.³⁰⁸ The BPA then concluded that the invention was statutory subject matter because it satisfied the three requirements of the useful, concrete, and practical test.³⁰⁹

Two BPA judges disagreed with this decision. Judge Smith interpreted the constitutional mandate for patents as restricted to inventions associated with science or technology.³¹⁰ Although he did not champion the technological arts test, Judge Smith noted that this test at least required an invention to be tied to a computer.³¹¹ He further noted that the method for compensating managers was a method that could have been executed at the time of the drafting of the Constitution.³¹² Judge Smith could not imagine that the drafters would have considered such an invention to be within the bounds of what they considered to be statutory subject matter.³¹³ Judge Barrett, in agreeing with the majority that the technological arts test lacked validity, nevertheless disagreed that the *Lundgren* invention was statutory subject mat-

³⁰³ *Id.*

³⁰⁴ *Id.*; see 35 U.S.C. § 112 (2006) (requiring patent claims to be sufficiently detailed in order to enable someone skilled in the art to replicate the invention).

³⁰⁵ *Ex parte Bowman*, 2001 WL 1646047 at *3.

³⁰⁶ See *id.*

³⁰⁷ *Ex parte Lundgren*, No. 2003-2088, 76 U.S.P.Q.2d 1385, 1386 (B.P.A.I. Sept. 28, 2005).

³⁰⁸ *Id.* at 1387.

³⁰⁹ *Id.* at 1386.

³¹⁰ *Id.* at 1388 (Smith, J., dissenting).

³¹¹ *Id.*

³¹² *Id.*

³¹³ *Ex parte Lundgren*, 76 U.S.P.Q.2d at 1388 (Smith, J., dissenting).

ter.³¹⁴ In reaching this conclusion, Judge Barrett embraced the previously discarded physical transformation test.³¹⁵ In essence, Judge Barrett agreed with Judge Smith that a disemboweled invention that could be executed separately and independently of any machine was not statutory subject matter.³¹⁶ Thus, the two judges would not validate any business method patent claim that was not computer implemented. The judges' position corresponds to the European approach under the EPC. In the parlance of the EPO, a business method not implemented on a computer would be a business method "as such," and thus fail the technicality requirement of Article 52.³¹⁷

D. *The Bilski Case*

In 2008 the CAFC took up the statutory subject-matter question once again in *In re Bilski*.³¹⁸ The CAFC's *Bilski* decision was likely influenced by dicta in two 2006 Supreme Court decisions that expressed doubts about whether CAFC rulings with respect to business method patents were correct. In *eBay, Inc. v. MercExchange, L.L.C.*, Justices Kennedy, Stevens, Souter, and Breyer voiced concern about granting permanent injunctive relief in business-method-patent infringement cases.³¹⁹ Their rationale was that such patents are potentially vague and of "suspect validity."³²⁰ In *LabCorp v. Metabolite Laboratories*, three justices questioned the validity of the *State Street Bank* holding.³²¹ In a dissenting opinion, Justices Breyer, Stevens, and Souter flatly rejected the CAFC's useful, concrete, and practical test because "[i]f taken literally, the statement would cover instances where this Court has held to the contrary."³²² Thus, the CAFC appeared to have a mandate to curtail patent coverage of business method patents.

The CAFC accepted this mandate in *In re Bilski*.³²³ The *Bilski* invention covered a method of hedging risk in commodity trading.³²⁴ Like

³¹⁴ *Id.* at 1389 (Barrett, J., dissenting).

³¹⁵ *Id.*

³¹⁶ *Id.*

³¹⁷ See EPC 2000, *supra* note 14, art. 52.

³¹⁸ See *In re Bilski*, 545 F.3d 943, 949 (Fed. Cir. 2008), *aff'd sub nom. Bilski v. Kappos*, 130 S. Ct. 3218 (2010).

³¹⁹ *eBay Inc v. MercExchange, L.L.C.*, 547 U.S. 388, 397 (2006) (Kennedy, J., dissenting).

³²⁰ *Id.*

³²¹ *Lab. Corp. of Am. Holdings v. Metabolite Labs. Inc.*, 548 U.S. 124, 136 (2006) (Breyer, J., dissenting).

³²² *Id.*

³²³ See *In re Bilski*, 545 F.3d at 961.

³²⁴ *Id.* at 949.

the *Bowman*³²⁵ and *Lundgren*³²⁶ claims, the *Bilski* invention did not require a computer for execution. It “merely manipulates [an] abstract idea and solves a purely mathematical problem.”³²⁷ The CAFC identified its task in examining claims that included mathematical algorithms to be that of determining whether the claimed use “would pre-empt all uses of that fundamental principle.”³²⁸ The CAFC considered this task daunting due to the complexity of modern claims.³²⁹ The CAFC, however, recognized that the machine or physical transformation test discussed in *Diehr* and earlier cases would be effective in rejecting overreaching patent claims.³³⁰ Moreover, the CAFC determined that the machine or physical transformation test was valid law despite the Supreme Court’s refusal to explicitly adopt the test in *Benson*, *Flook*, and *Diehr*.³³¹ Thus, *In re Bilski* wiped clean several decades of CAFC and CCPA jurisprudence while taking a step that the Supreme Court seemed reluctant to take. On the appeal for *In re Bilski*, the Supreme Court would respond to the CAFC’s reasoning.

On June 28, 2010, nearly eight months after hearing oral arguments in *Bilski v. Kappos*,³³² the Supreme Court issued its long-awaited decision on the last day of its term. Although the justices were unanimous in finding *Bilski*’s invention not patentable, they divided on the legal reasoning and where to draw the line concerning the patentability of business methods. Five justices reasoned that Section 101 does not preclude the patentability of all methods of doing business, stating that “a business method is simply one kind of ‘method’ that is, at least in some circumstances, eligible for patenting.”³³³ Four justices concluded that “although a process is not patent-ineligible simply because it is useful for conducting business, a claim that merely describes a method of doing business” is not patentable.³³⁴

The majority—while not rejecting the CAFC’s revitalized machine-or-physical-transformation test—refused to endorse the CAFC’s effort to resolve the subject-matter question, and ultimately failed to articulate

³²⁵ *Ex parte Bowman*, 2001 WL 1646047 at *2.

³²⁶ *Ex parte Lundgren*, 76 U.S.P.Q.2d at 1387.

³²⁷ *In re Bilski*, 545 F.3d at 950.

³²⁸ *Id.* at 954.

³²⁹ *See id.*

³³⁰ *See id.*

³³¹ *See Diehr*, 450 U.S. at 189–90, 191–92; *Flook*, 437 U.S. at 589–90; *Benson*, 409 U.S. at 71.

³³² *Bilski v. Kappos*, 130 S. Ct. 3218 (2010).

³³³ *Id.* at 3228.

³³⁴ *Id.* at 3232 (Stevens, J., concurring).

a test or set a clear standard.³³⁵ Rather, the Court returned responsibility to the CAFC to develop “less extreme means” than the machine or physical-transformation test to limit business method patentability. The Court advised the CAFC to try a variety of approaches “including (but not limited to) application of our decisions in *Benson*, *Flook*, and *Diehr*.”³³⁶

Such approaches cannot rely solely on the machine or physical-transformation test, however. The Court admonished the CAFC that the test “is not the sole test for deciding whether an invention is a patent-eligible ‘process.’”³³⁷ Tracking earlier Supreme Court patent subject-matter jurisprudence, the Court asserted that the test “is a useful and important clue, an investigative tool, for determining whether some claimed inventions are processes under §101.”³³⁸ The Court went on to explain that while it may have been sufficient for evaluating processes “similar to those in the Industrial Age,”³³⁹ they doubted its usefulness for the “Information Age”³⁴⁰ in which “new technologies may call for new inquiries.”³⁴¹ Therefore, rather than approving the CAFC’s gutsy attempt to curtail business method patent claims—or taking a similarly bold step to provide clarity—the Court cautiously relied on its *Benson*, *Flook*, and *Diehr* decisions to reject Bilski’s claims as unpatentable abstract ideas.³⁴² Without articulating a clear test, the Court concluded that “[t]he concept of hedging, described in claim 1 and reduced to a mathematical formula in claim 4, is an unpatentable abstract idea, just like the algorithms at issue in *Benson* and *Flook*.”³⁴³

Justice Stevens and the concurring justices would have drawn a clearer line in the sand. Relying on interpretation of “process” as a term of art anchored in historical practice, the concurrence concluded that “[a] business method is not a ‘process’” under Section 101, and therefore not patentable.³⁴⁴ Justice Breyer, while agreeing with Stevens that business methods are not patentable processes, wrote a separate

³³⁵ See *id.* at 3226–27, 3231 (majority opinion).

³³⁶ *Id.* at 3231.

³³⁷ *Id.* at 3227.

³³⁸ *Bilski*, 130 S. Ct. at 3227.

³³⁹ *Id.*

³⁴⁰ *Id.*

³⁴¹ *Id.* at 3227–28.

³⁴² See *id.* at 3229–30.

³⁴³ *Id.* at 3231.

³⁴⁴ *Bilski*, 130 S. Ct. at 3249–50 (Stevens, J., concurring).

concurrence to “highlight the substantial *agreement* among the many Members of the Court.”³⁴⁵

Nevertheless, the case narrows the scope of patentable subject matter from the “useful, concrete and tangible result” test articulated in *State Street Bank*.³⁴⁶ Rather than completely rejecting the machine or physical transformation test, all three opinions agree that the test has been a “useful and important clue” but not the “sole test” for determining patentability.³⁴⁷ This previously discarded test has thus regained the stature it had under *Benson*, *Flook*, and *Diehr*. Although Justice Kennedy’s opinion does not expressly reject the useful, concrete, and tangible test, Kennedy’s opinion indirectly rejected past CAFC patent process subject-matter decisions.³⁴⁸ Indeed, five justices in the two concurring opinions went even further by explicitly rejecting the *State Street Bank* standard.³⁴⁹

Following *Bilski v. Kappos*, U.S. patent process subject-matter law has thus returned to the 1980s, perhaps with a revitalized exclusion for abstract ideas. Any mixed process claim that does not solely claim a law of nature, physical transformation, or abstract idea meets the initial patent subject-matter threshold.³⁵⁰ Until the CAFC provides additional guidance, however, the USPTO must apply the amorphous standards of *Benson*,³⁵¹ *Flook*,³⁵² and *Diehr*.³⁵³ If the claim provides a physical transformation of matter, then the decisions agree that the claim is patentable.³⁵⁴ Otherwise, it is unclear whether and under what conditions process claims will escape the abstract idea exclusion. Regardless, a claim to a business method patent must also meet the other patent requirements of novelty and non-obviousness.³⁵⁵ Thus, as the majority opinion obliquely suggests, the CAFC may shift the critical patentability

³⁴⁵ *Id.* at 3257–58 (Breyer, J., concurring).

³⁴⁶ Compare *id.* at 3227 (majority opinion), with *State St. Bank*, 149 F.3d at 1373.

³⁴⁷ *Bilski*, 130 S. Ct. at 3227, 3232 (Stevens, J., concurring), 3258 (Breyer, J. concurring).

³⁴⁸ *Id.* at 3221 (majority opinion) (stating that the opinion should not “be read as endorsing interpretations of § 101 that the Court of Appeals for the Federal Circuit has used in the past”).

³⁴⁹ See *id.* at 3232 n.1 (Stevens, J., concurring) (“[I]t would be a grave mistake to assume that anything with a ‘useful, concrete and tangible result’ . . . is patentable.”) (citation omitted) (quoting *State St. Bank*, 149 F.3d at 1368), 3259 (Breyer, J., concurring) (“[I]f taken literally, the statement [that anything which produces a useful, concrete, and tangible result is patentable] would cover instances where this Court has held the contrary.”).

³⁵⁰ *Id.* at 3225 (majority opinion).

³⁵¹ See *Benson*, 409 U.S. at 71–72.

³⁵² See *Flook*, 437 U.S. at 594–95.

³⁵³ See *Diehr*, 450 U.S. at 191–92.

³⁵⁴ *Id.* at 192; *Flook*, 437 U.S. at 594; *Benson*, 409 U.S. at 71.

³⁵⁵ 35 U.S.C. §§ 102, 103; see *Diehr*, 450 U.S. at 191.

standard to these tests rather than to the subject-matter requirement of Section 101.³⁵⁶

III. THE EUROPEAN PATENT OFFICE TREATMENT OF SOFTWARE PATENTS

Direct comparison of U.S. and European patent law in the area of software and business method patents is difficult for both systemic and substantive reasons. The systematic reasons involve the lack of jurisprudential uniformity in Europe. Within Europe, the EPO as well as the national patent offices and courts of the contracting states interpret and apply the EPC.³⁵⁷ Each nation, in transposing EPC requirements into national legislation, altered its own substantive and procedural law to approximate its laws to the EPC.³⁵⁸ Although this has harmonized the law to some extent, national patent offices and courts can and do interpret the requirements of the EPC differently than the EPO and other national courts.³⁵⁹

The substantive reasons for difficulty involve the “technical” requirement for patentability that exists at the heart of European patent law.³⁶⁰ U.S. patent law does not have a direct corollary. The exact nature of the technical contribution requirement as it relates to computer programs and business methods is chimerical. Not only have the tests for technicality been a moving target, often conflicting within and among jurisdictions, but the EPO has never provided a clear and workable legal definition of “technical” as it relates to software and business method patents.³⁶¹

³⁵⁶ See *Bilski*, 130 S. Ct. at 3229–31. This is similar to the approach taken by the EPO in determining whether business methods and software patent claims should be granted. See KEITH BERESFORD, *PATENTING SOFTWARE UNDER THE EUROPEAN PATENT CONVENTION* 116 (2000); EUROPEAN PATENT OFFICE, *PATENTS FOR SOFTWARE? EUROPEAN LAW AND PRACTICE* 3 (2009) [hereinafter *PATENTS FOR SOFTWARE?*].

³⁵⁷ See *infra* notes 679–682 and accompanying text.

³⁵⁸ See, e.g., *infra* Part III.A.

³⁵⁹ See *infra* Part IV.C. Failure to separate questions of patentability from those of enforcement of granted patent presents a weakness in the current debate over software patents in Europe. Andreas Grosche, *Software Patent—Boon or Bane for Europe?* 14 *INTER. J. L. & INFO. TECH.* 257, 269 (2006). Nevertheless, the possibility of differing interpretations by patent granting offices and by the courts tasked with determining the validity of European patents figure largely in the European problem. See *infra* Parts IV.C.3 and V.B.

³⁶⁰ Christopher Laub, *Software Patenting: Legal Standards in Europe and the US in View of Strategic Limitations of the IP Systems*, 9 *J. WORLD INTELL. PROP.* 344, 344–46 (2007).

³⁶¹ See Greg Aharonian, *Why All Business Methods Achieve a Technical Effect?*, *INTERNET PATENT NEWS SERVICE* (Oct. 2001), <http://www.bustpatents.com/aharonian/bzmttdtch.htm> (citing an EPO decision from September 2000, which recognizes that the meaning of the term “technical” is not very clear). Aharonian subsequently quotes a private communication between himself and an EPO official on the meaning of “technical”:

In this Part, we begin with an introduction to the European patent system to highlight the systemic difficulties in creating a unified law on software and business method patents.³⁶² We then examine the evolution and present state of patentability of computer programs and business methods in the European Patent Office.³⁶³ Part IV then addresses the United Kingdom.³⁶⁴ The United Kingdom serves as an apt European comparative jurisdiction because of its recent history of patent practice and EPC interpretation that is at odds with the EPO. Part IV also includes a brief analysis of Germany's patent practice in this area due to Germany's significance as the largest European Union state.³⁶⁵

A. *The European Patent System*

In the United States, the USPTO examines applications and decides whether to grant a patent.³⁶⁶ Only federal courts decide issues of patent infringement and validity and only the CAFC hears patent appeals, with the Supreme Court as the final arbiter of patent law.³⁶⁷ As a result, patent law is arguably one of the more unified areas of law in the United States because there exists no possibility of conflicting interpretations of patent law among the circuits. The EU experience of patent law over the last half century is fundamentally different. Unlike copyright and trademark law, the European Union has no directive or other legal instrument harmonizing substantive patent law across the member states.³⁶⁸ Although pan-European agreements have developed for patents, these agreements, including the EPC, are not instruments of

Technical. I'm glad you asked me about that. It's a wonderful word, fuzzy and yet sounds meaningful. We love it. Until 2001, it had no basis whatsoever in the EPC, just a passing mention in a couple of rules. . . . I agree that we've never defined 'technical'. It's deliberate and allows us to fine-tune as a consensus develops on what should be patentable. Yes, I do know the correct way to do that is by amending the law, but have you any idea how hard it is to get consensus on amending the EPC?

Id.

³⁶² See *infra* Part III.A.

³⁶³ See *infra* Part III.B–D.

³⁶⁴ See *infra* Part IV.A.–C.

³⁶⁵ See *infra* Part IV.D.

³⁶⁶ See, e.g., Russel Burke Hill & Vince Cangolosi, *United States of America* § 2.1, in *GLOBAL PATENT LITIGATION* (Willem A. Hoyng & Frank W.E. Eijssvogels eds., 2006).

³⁶⁷ See, e.g., *id.* §§ 5.4.1, 5.4.5–6.

³⁶⁸ See Bakels & Hugenholtz, *supra* note 6, at 6 (“The only existing directive in this area is the Biotechnology Directive adopted in 1998.”) The Proposed EU Directive on Patents for Computer-Implemented Inventions failed. Ford, *supra* note 52, at 49.

the European Union.³⁶⁹ Although each EU Member State is a contracting party to the EPC, it is a *sui generis* European convention developed from efforts to harmonize both European and EU patent law. Within the European Union it has been characterized as a “stop-gap approach to a more far reaching harmonisation.”³⁷⁰

Currently, a person wishing to protect an invention in a particular European Union member state has the option of filing an application for a national patent or for a European patent.³⁷¹ For the former, the applicant files with the national patent office in the member state.³⁷² For the latter, application is made to EPO under the terms of the EPC, which provides a mechanism for obtaining a “European patent” using one central application procedure.³⁷³ The applicant then designates the EPO contracting states in which he or she wants patent protection.³⁷⁴

Once the EPO grants the European patent, the patent holder must register it in the appropriate contracting states, where it receives the same rights that would be conferred by a patent granted in that country.³⁷⁵ The European patent becomes a “bundle of national rights.”³⁷⁶

³⁶⁹ See EPC 2000, *supra* note 14, arts. 1–2; Convention on the Unification of Certain Points of Substantive Law on Patents for Invention, art. 1, *opened for signature* Mar. 24, 1971, 1249 U.N.T.S. 369 [hereinafter *Strasbourg Convention*].

³⁷⁰ PHILIP LEITH, *HARMONISATION OF INTELLECTUAL PROPERTY IN EUROPE: A CASE STUDY OF PATENT PROCEDURE* 104 (Adrian Chandler ed., 1998). The prospect of an EU patent reemerged in December of 2009 when the Council of the European Union unanimously supported a decision on the EU joining the EPC and creating a unified Patent Court. The EU Council agrees on next steps regarding the Community patent (EU patent). See *EU Council Agrees on Next Steps Regarding the Community Patent* (Dec. 8, 2009), <http://www.epo.org/topics/news/2009/20091208.html>. The European Court of Justice is expected to rule on whether the proposal is compatible with the EU Treaty in 2010. If the result is favorable, the proposal will proceed to the European Parliament. Benoit Strowel, *IP: Latent Patent*, *THE LAWYER* (Jan. 18, 2010), <http://www.thelawyer.com/latent-patent/1003177.article>.

³⁷¹ See Ian Judge, *Developments in the Harmonisation of European Patent Law and Litigation*, in 7 *INTERNATIONAL INTELLECTUAL PROPERTY LAW AND POLICY* 28–1, 28–1 (Hugh C. Hanson, ed., 2002). The WIPO-administered Patent Cooperation Treaty provides a third method for obtaining a patent in a European Union member state. See CORNISH & LLEWELYN, *supra* note 18, at 124–25.

³⁷² See Judge, *supra* note 371, at 28–1.

³⁷³ EPC 2000, *supra* note 14, art. 75.

³⁷⁴ See Judge, *supra* note 371, at 28–1. The designation may include one or more of the 27 European Union contracting states, eight non-European Union EPO members and/or the three EPO extension states. See *Member States of the European Patent Organization*, EUROPEAN PATENT OFFICE, <http://www.epo.org/about-us/epo/member-states.html> (last updated Mar. 3, 2011). In addition to the 27 EU Member states, Albania, Croatia, Iceland, Lichtenstein, Macedonia, Monaco, Norway, San Marino, Switzerland and Turkey are contracting states and it is possible to extend patent protection to Bosnia & Herzegovina, Montenegro, and Serbia. *Id.*

³⁷⁵ EPC 2000, *supra* note 14, art. 64.

³⁷⁶ Grosche, *supra* note 359, at 269.

Theoretically, there is no difference between a European patent and one granted by a national patent office, with the exception that the European patent may be subjected to a post-grant opposition procedure at the EPO in Munich.³⁷⁷ Whether the patent is granted by the EPO or a national patent office, the patent holder must enforce it in the national courts in the countries in which the patent is registered.³⁷⁸ National courts have the power to revoke a European patent on a number of grounds, including invalidity, but the EPO does not have jurisdiction to revoke a nationally granted patent.³⁷⁹ National courts interpreting their substantive and procedural rules are not obligated to follow EPO cases as precedents.³⁸⁰ Likewise, national court decisions have no direct consequence on EPO decisions, although EPO cases have considered national decisions and vice versa.³⁸¹ A major implication of this structure is that patent application, validity opposition, and litigation practice requires very sophisticated planning. It also opens the possibility of differing interpretations of the law and patentability standards among the various entities charged with interpreting and applying the law.

Technical Boards of Appeal within the EPO interpret the EPC through its case law.³⁸² If an applicant is dissatisfied with a non-award, or if a third party wishes to oppose the grant of a patent, that party may appeal to the EPO Technical Board of Appeal.³⁸³ The Technical Boards of Appeal are highly centralized as to subject matter and expertise, with the same board deciding cases within a given technical area.³⁸⁴ Technical Board of Appeal 3.5.01 decides cases involving computer programs

³⁷⁷ Judge, *supra* note 371, at 28–1. The opposition must be commenced within nine months of the grant. *Id.* An opposition may last for five years or more and may result in the revocation of the patent or an amendment to the claims defining the scope of the patent. *Id.* There is no similar opposition procedure in U.S. patent practice. *Cf.* Hill & Cangolosi, *supra* note 366, § 5.2 (discussing the lack of role the USPTO plays in infringement litigation).

³⁷⁸ EPC 2000, *supra* note 14, art. 64(3) (“[I]nfringement . . . shall be dealt with by national law.”).

³⁷⁹ See Willem A. Hoyng, *Global Patent Litigation (Strategy)* § 1, in GLOBAL PATENT LITIGATION, *supra* note 366; LEITH, *supra* note 370, at 103–04.

³⁸⁰ See LEITH, *supra* note 370, at 104–07.

³⁸¹ See *id.* at 111–13, 167, 169–70, 177.

³⁸² See *id.* at 112–14.

³⁸³ EPC 2000, *supra* note 14, arts. 107, 110.

³⁸⁴ See *Business Distribution Scheme of the Technical Boards of Appeal for the Year 2011*, EUR. PATENT OFFICE 1–3 (2011), [http://documents.epo.org/projects/babylon/eponet.nsf/0/E03905748280E6A5C12578080041D13A/\\$File/business_distribution_scheme_technical_01012011.pdf](http://documents.epo.org/projects/babylon/eponet.nsf/0/E03905748280E6A5C12578080041D13A/$File/business_distribution_scheme_technical_01012011.pdf).

and business methods as computer-implemented inventions.³⁸⁵ Technical Boards of Appeal have “interpretive supremacy” for the EPC.³⁸⁶ In the majority of cases, a particular Technical Board functions as the body of final appeal on matters of patent law.³⁸⁷ In narrowly defined circumstances, a legal question may go to the Enlarged Board of Appeal “to ensure uniform application of the law, or if a point of law of fundamental importance arises.”³⁸⁸ The President of the EPO or a Technical Board of Appeal on its own motion or in granting a party’s request, may refer questions on points of law to an Enlarged Board of Appeal.³⁸⁹ The EPC substantially constrains the nature of questions the Enlarged Board of Appeal may decide. It may only review Technical Boards of Appeal decisions in narrowly defined circumstances and only on narrowly defined legal issues.³⁹⁰ Therefore, the Enlarged Board of Appeal does not function in the same manner as the CAFC or the U.S. Supreme Court.

These limitations mean that the Enlarged Board has provided little guidance for subject-matter questions. To date, despite a recommendation from an English judge,³⁹¹ a request for a referral from a party to a Technical Board of Appeal case,³⁹² and a referral from the EPO Presi-

³⁸⁵ See *id.*; see also G06: Computing; Calculating; Counting, WORLD INTEL. PROP. ORG. 8, 14–15 (Jan. 2010), http://www.wipo.int/ipc/itos4ipc/ITSupport_and_download_area/20100101/pdf/scheme/advanced/en/g06.pdf (Technical Board of Appeal 3.5.01 has jurisdiction over patents with main international patent classifications G06F17 and G06Q, which cover digital computing methods and data processing and other methods adapted for business purposes). The EPO uses the terminology “computer-implemented invention” (CII), defined as “an invention whose implementation involves the use of a computer, computer network or other programmable apparatus, the invention having one or more features which are realised wholly or partly by means of a computer program.” PATENTS FOR SOFTWARE?, *supra* note 356, at 3. The EPO explains the term “software” is too ambiguous. *Id.* Recently, however, CII has become a euphemism for the more controversial “software patent.” Andrés Guadamuz González, *The Software Patent Debate*, 1 J. INTEL. PROP. L. & PRAC. 196, 198–99 (2006).

³⁸⁶ Case G-3/08, Programs for Computers, [2010] O.J.E.P.O. 10, 22 (Enlarged Bd. Appeal, May 12, 2010), available at http://archive.epo.org/epo/pubs/oj011/01_11/01_0101.pdf.

³⁸⁷ See *id.* at 23.

³⁸⁸ EPC 2000, *supra* note 14, art. 112(1).

³⁸⁹ *Id.* The Enlarged Board may also initiate a referral. See LEITH, *supra* note 370, at 113–114.

³⁹⁰ See EPC 2000, *supra* note 14, art. 112(1).

³⁹¹ See *Aerotel Ltd. v. Telco Holdings Ltd.*, [2006] EWCA (Civ) 1371, [75–76], [2007] 1 All E.R. 225 (A.C.) at 236 (Eng.).

³⁹² Case T-154/04, Estimating Sales Activity/DUNS LICENSING ASSOCS., [2008] O.J.E.P.O. 46, 46 (Technical Bd. Appeal 3.5.01, Nov. 15, 2006), available at http://archive.epo.org/epo/pubs/oj008/02_08/02_0468.pdf.

dent,³⁹³ the Enlarged Board of Appeal has not directly addressed questions on law relating to computer software.³⁹⁴ On May 12, 2010, after eighteen months of deliberation, the Enlarged Board of Appeal declined to rule on the questions referred by the EPO President.³⁹⁵ The Enlarged Board rejected the referral on grounds that the questions were inadmissible or not subject to review because they did not meet the narrow requirements for review under the EPC. The Enlarged Board concluded that the EPC allows a review only when it is necessary to ensure uniform application of the law and when two Technical Boards of Appeal have given “different decisions” on the question referred.³⁹⁶

After reviewing the relevant case law, the Enlarged Board determined that the cases identified as “different” did not meet EPC requirements.³⁹⁷ The Enlarged Board interpreted the EPC as requiring a “conflict in the case law making it difficult if not impossible for the Office to bring its patent granting practice into line with the case law of the Boards of Appeal.”³⁹⁸ The implications of this “non-ruling” are immense. The Technical Board of Appeal 3.5.01 remains the body of last resort within the EPO for decisions concerning computer programs and business methods and determines examining practice within the EPO. Once a Technical Board of Appeal or Enlarged Board has decided a case, there is no recourse for review to a national or multinational court.³⁹⁹ Thus, it is unlikely that any judicial or quasi-judicial European entity will soon provide any software subject-matter guidance.

One objective of the EPC is for patent examination and patentability decisions to produce the same result whether the patent is examined or opposed in the EPO, a national patent office in France or Germany, or in an invalidity action in the United Kingdom or the Netherlands.⁴⁰⁰

³⁹³ Referral by the President of the European Patent Office to the Enlarged Board of Appeal dated 23 October 2008 Regarding Divergent Decisions of Two Boards of Appeal, [2009] O.J.E.P.O. 142, 142, *available at* http://archive.epo.org/epo/pubs/oj009/03_09/03_1429.pdf.

³⁹⁴ LEITH, *supra* note 370, at 26.

³⁹⁵ *Programs for Computers*, [2010] O.J.E.P.O. at 30.

³⁹⁶ *Id.* at 23.

³⁹⁷ *See id.* at 30.

³⁹⁸ *Id.* at 25.

³⁹⁹ *See* EPC 2000, *supra* note 14, art. 112(3); TRITTON ET AL., *supra* note 23, at 181 (explaining that national courts of Member States *only* have the right to try infringement actions).

⁴⁰⁰ *See* EPC 2000, *supra* note 14, at pmbl. Prior to implementation of the EPC, substantive differences existed in national patent offices. *See* LEITH, *supra* note 370, at 105. For example, the United Kingdom was known for a very strict view of claim interpretation while the practice in Germany and the Netherlands extended to undefined inventive concepts. 1 CHAR-

To facilitate harmonization of patent law through EPC implementation, national examining offices and courts do not possess broad discretion to interpret claims in accordance with what had been national practice prior to the EPC. Instead, they should interpret according to EPO practice.⁴⁰¹ Nevertheless, the structure of the system has precluded complete harmonization. Variances between approaches to EPC substantive law in national patent offices, which generally rule in accordance with national decisions, mean that substantive differences remain.⁴⁰² Under the current system, it is possible that an application for the same invention may be granted by the EPO or the German patent office but denied by the U.K. Intellectual Property Office, and a claim for invalidity of the same European patent may be interpreted differently in different countries.⁴⁰³ These factors contribute to a lack of uniformity in the substantive law.

Furthermore, the absence of a multinational reviewing court to rule on inconsistencies between national courts and the EPO interpretations has impeded harmonization. Because national courts decide cases within their own legal traditions, they interpret provisions of the EPC differently, as implemented into their national law. Thus a patent may be revoked in one country that remains valid in another.⁴⁰⁴ This has led to particular problems in the area of computer software and business methods. In difficult cases, national courts applying national law do not decide consistently.⁴⁰⁵ Furthermore, because the courts in the United Kingdom are required to follow their precedents,⁴⁰⁶ and the EPO does not recognize *stare decisis*, the possibility of differing results is magnified.

B. Origins of the "Technical" Requirement

The U.S. patent statute and EPC take differing approaches to patentability. U.S. law defines patentable inventions *positively*, as "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof,"⁴⁰⁷ and leaves exclusions

TERED INSTITUTE OF PATENT AGENTS, EUROPEAN PATENTS HANDBOOK § 2.6.17 (Tim Roberts et al. eds., 2d ed. Supp. 2009) [*hereinafter* CIPA].

⁴⁰¹ Cf. LEITH, *supra* note 370, at 111–13 (discussing the rise of courts in the United Kingdom, the Netherlands, and Germany adjusting to EPO jurisprudence).

⁴⁰² See TRITTON ET AL., *supra* note 23, at 86–87.

⁴⁰³ CIPA, *supra* note 400, § 2.6.17.

⁴⁰⁴ See Bakels & Hugenholtz, *supra* note 6, at 39.

⁴⁰⁵ See *id.*

⁴⁰⁶ See *infra* note 513 and accompanying text.

⁴⁰⁷ 35 U.S.C. § 101 (2006). In a rather circular manner, the code defines invention as an "invention or discovery" and process as "process, art, or method." 35 U.S.C. § 100(a), (b).

to judicial interpretation. The EPC—while setting out the general requirements of novelty,⁴⁰⁸ inventive step,⁴⁰⁹ and industrial application⁴¹⁰—defines invention *negatively*, according to what is excluded. Article 52 presents a non-exclusive list of things not considered inventions, including: “discoveries, scientific theories and mathematical methods”;⁴¹¹ “aesthetic creations”;⁴¹² and “schemes, rules and methods for performing mental acts, playing games or doing business, and programs for computers.”⁴¹³ The EPO’s “Guidelines for Examination” indicate that the items listed in Article 52(2) are those that are either abstract or do not have a technical character.⁴¹⁴ The list of excluded non-inventions, however, must be read in conjunction with Article 52(3), which narrows the exclusion of these items and activities to the extent that the patent application relates to excluded subject-matter “as such.”⁴¹⁵ This means that a claim to a business method or computer program is not allowed, but “claims to physical entities or processes relating to such items may be allowable.”⁴¹⁶ The exclusions and their limitations are understood to reinforce the requirement that “invention” means technical invention.⁴¹⁷

“Technical character” does not present a problem in traditional fields such as chemistry or engineering.⁴¹⁸ The requirement resides deep in the origins of European patent law and has been “part of the European legal tradition since the early days of the patent system.”⁴¹⁹ According to the EPO, in order to be patentable, the subject matter

⁴⁰⁸ EPC 2000, *supra* note 14, arts. 52(1), 54.

⁴⁰⁹ *Id.* arts. 52(1), 56. Under U.S. law, this requirement is known as the “non-obvious” condition for patentability. 35 U.S.C. § 103.

⁴¹⁰ EPC 2000, *supra* note 14, arts. 52(1), 57.

⁴¹¹ *Id.* art. 52(2) (a).

⁴¹² *Id.* art. 52(2) (b).

⁴¹³ *Id.* art. 52(2) (c).

⁴¹⁴ EUROPEAN PATENT OFFICE, *Guidelines for Examination in the EPO*, pt. C, ch. IV, § 2.1 (Mar. 31, 2010), available at http://www.epo.org/patents/law/legal-texts/html/guix/e/c_iv_2_1.htm.

⁴¹⁵ EPC 2000, *supra* note 14, art. 52(3).

⁴¹⁶ CIPA, *supra* note 400, § 3.4.

⁴¹⁷ TRITTON ET AL., *supra* note 23, at 91.

⁴¹⁸ Aloys Hüttermann & Ulrich Storz, *A Comparison Between Biotech and Software Related Patents*, 31 EUR. INTELL. PROP. REV. 589, 589 (2009) (explaining that circumstances in which chemical compounds may be patented were resolved decades ago, but the technicality of biotech and software-related inventions are still in flux); *see also* BERESFORD, *supra* note 356, at v–vi (explaining that Boards of Appeal cases reveal that some patents are rejected based on the steps performed by an operator regardless of technical character); Grosche, *supra* note 359, at 271 (explaining that whether software makes a “technical contribution” turns on how this term of art is defined).

⁴¹⁹ PATENTS FOR SOFTWARE?, *supra* note 356, at 9.

must have “a ‘technical character’ or, to be more precise, involve a ‘technical teaching.’”⁴²⁰ Discussions of the technical requirement were part of the earliest European harmonization efforts.⁴²¹ The Strasbourg Convention, the Council of Europe instrument that began the process of harmonization of European patent law, did not mention a technical requirement or expressly define the term “invention.”⁴²² It required signatory countries to grant patents “for any inventions which are susceptible of industrial application, which are new and which involve an inventive step.”⁴²³ When the Strasbourg Convention was adopted in 1963, the six members of the European Economic Community—the precursor to the European Union—were working toward both a single patent legal system for the common market and a single system for granting patents.⁴²⁴ During the first phase of the negotiations from 1961 to 1964, the delegations debated whether to follow the language of the Strasbourg Convention or to adopt a new, positive definition of inventions.⁴²⁵ The delegations rejected a proposal to make “technical progress” an explicit requirement of patentability, reasoning that it was unnecessary because the term “inventions” implies a contribution to technical knowledge and technical progress.⁴²⁶ Therefore, including “technical” in the language of the convention would be redundant.⁴²⁷ As a result, no positive legal definition of “technical” emerged from the

⁴²⁰ *Id.*

⁴²¹ *See id.* As early as 1959, differences in national patent regimes acted as a barrier to trade and movement of goods, so the members of the European Economic Community convened a working group to discuss a unified patent system. *See* CORNISH & LLEWELYN, *supra* note 18, at 127 (noting that efforts were set aside when Britain failed to enter the EEC, because member states desired having Britain’s expertise in the matter). Such a system would include not only uniform substantive law, but a judicial system through the European Union courts, as arbiter of European patent disputes. *See id.* at 127–29. Neither a Community patent nor a patent court has been established within the European Union. *See id.* at 128–29.

⁴²² *See* Strasbourg Convention, *supra* note 369, arts. 1–6. The Convention was not limited to members of the Council of Europe. *See id.* at pmbl n.1. The Convention’s purpose was to unify certain points of substantive patent law to assist European industry and, more ambitiously, to contribute “to the creation of an international patent.” *Id.* at pmbl.

⁴²³ *See id.* art. 1.

⁴²⁴ *See* Justine Pila, *Article 52(2) of the Convention on the Grant of European Patents: What Did the Framers Intend? A Study of the Travaux Préparatoires*, 36 INT’L REV. INTELL. PROP. & COMP. L. 755, 757–58 (2005).

⁴²⁵ *See id.* at 758–59.

⁴²⁶ *See* BERESFORD, *supra* note 356, at 13; Pila, *supra* note 424, at 759.

⁴²⁷ *See* BERESFORD, *supra* note 356, at 13; Pila, *supra* note 424, at 759.

conference and the *travaux préparatoires* provide no assistance in determining the framers' intent on the issue.⁴²⁸

At the time the EPC was negotiated, computer programs existed, but the software industry did not.⁴²⁹ The delegates feared that fixing definitions of "invention" and "technicality" would impair the flexibility of the EPC to accommodate developing technology.⁴³⁰ The EPC also does not define "programs for computers" or the other exclusions.⁴³¹ Although some delegations strongly opposed including "programs for computers" in the list of Article 52(2) exclusions, the EPC ultimately included it.⁴³² The delegates concluded that any attempt to define this term would be futile, and that interpretation should be left to the EPO.⁴³³ Leaving interpretive decisions to the EPO has far from clarified the legal definitions of "technical character," "computer programs," and the "as such" limitation on exclusions.

In 2000, the contracting parties adopted a new version of the EPC. Currently, Article 52(1) of the EPC mandates that European patents shall be granted "for any inventions, *in all fields of technology*, provided that they are new, involve an inventive step, and are susceptible of industrial application."⁴³⁴ It has been suggested that the addition of language "in all fields of technology," which did not appear in the original EPC, codifies the technology requirement.⁴³⁵ Although commentators characterize this change to Article 52 as one of the most significant

⁴²⁸ Pila, *supra* note 424, at 760. In examining Professor Pila's work, Justice Jacob found that her analysis of the *Travaux Préparatoires* led to this result. *Aerotel*, [2007] 1 All E.R. at 232.

⁴²⁹ See Martin Kretschmer, *Software as Text and Machine: The Legal Capture of Digital Innovation*, J. INFO. L. & TECH., pt. 1 (July 4, 2003), http://www.cippm.org.uk/pdfs/JILT%20kretschmer%2011_03.pdf.

⁴³⁰ Reinier B. Bakels, *Should Only Technical Inventions Be Patentable, Following the European Example?*, 7 NW. J. TECH. & INTELL. PROP. 50, 55 (2008).

⁴³¹ See EPC 2000, *supra* note 14, art. 52(2). In addition to "programs for computers," the EPC excludes the following from patentability: "discoveries, scientific theories and mathematical methods"; "aesthetic creations"; "presentations of information"; and "schemes, rules, and methods for performing mental acts, playing games, or doing business." *Id.*

⁴³² See Pila, *supra* note 424, at 769.

⁴³³ See *id.*

⁴³⁴ EPC 2000, *supra* note 14, art. 52(1) (emphasis added). The EPC 2000 applies to all patent applications filed on or after December 13, 2007. *The European Patent Convention*, EUR. PATENT OFFICE (Jul. 1, 2011), <http://www.epo.org/patents/law/legal-texts/epc.html>. Most of the cases considered *infra* Part VI.B. were decided under EPC 1973, unless otherwise noted. See *id.*

⁴³⁵ See Bakels & Hugenholtz, *supra* note 6, at 54. EPC 2000 was adopted by decision on June 28, 2001, in part to incorporate obligations imposed by the Agreement on Trade Related Aspects of Intellectual Property (TRIPS) and the Patent Cooperation Treaty (PCT). *Id.* at 54–55 (citing explanatory document from the Munich conference).

changes in the EPC,⁴³⁶ they do not expect it to impact substantive law as it relates to patentability.⁴³⁷ As discussed, under EPC 1973, technical character acted as an implicit requirement of patentability.⁴³⁸ Moreover, although a technical requirement is not expressly mentioned in the EPC 1973, it is at the heart of Article 52 jurisprudence.⁴³⁹

Commentators have also suggested that the technical requirement originates from the Article 57 requirement that inventions be “susceptible of industrial application.”⁴⁴⁰ The meaning of this phrase, however, differs in various European translations.⁴⁴¹ For example, the French and Dutch languages use the term “industrie” only when referring to manufacturing businesses. In comparison, the English language uses “industry” more broadly.⁴⁴² The German requirement of “gewerblich anwendbar” (commercially applicable) is broader than technical manufacturing, but not as broad as the English meaning of industry.⁴⁴³

C. *The EPO Technical Board of Appeal Decisions*

Originally EPO examiners routinely denied any applications related to software inventions and programs under EPO examination guidelines in place at the time.⁴⁴⁴ Since its first decision in 1986, however, the Technical Board of Appeal 3.5.01 has taken what could be characterized as an expansive view of these inventions’ patent eligibility. Once the board took the position that examiners should not deny an application simply because it involved a computer program, the EPO started down a slippery slope.⁴⁴⁵ The Technical Board of Appeal has articulated various tests to delimit the contours of the technical charac-

⁴³⁶ CIPA *supra* note 400, § 2.7.2.

⁴³⁷ See Stefan Steinbrenner, *The European Patent Convention* 41–42 (Supp. 3 Aug. 2009), in 1 SOFTWARE PATENTS WORLDWIDE (Gregory A. Stobbs ed., 2008).

⁴³⁸ See *supra* text accompanying notes 415–417.

⁴³⁹ See Steinbrenner, *supra* note 437, at 31–39 (discussing the development of Boards of Appeal decisions relating to Article 52: each decision requires a computer program to have a technical feature to be patentable).

⁴⁴⁰ Bakels & Hugenholtz, *supra* note 6, at 4.

⁴⁴¹ *Id.*

⁴⁴² *Id.* at 4–5.

⁴⁴³ *Id.* at 5.

⁴⁴⁴ See LEITH, *supra* note 6, at 11.

⁴⁴⁵ *Id.* at 8–11. Because “any good patent attorney . . . could transmute a software invention into a hardware one,” once the decision was made that the inventions were not automatically excludable, “any attempt to hold the line becomes untenable because the definition of protectable technology changes under the continual assault of perceptive patent attorneys who locate logical contradiction and push the examiners towards removing that logical weakness.” *Id.* at 9.

ter requirement for computer-implemented inventions.⁴⁴⁶ The tests and results have often been contradictory, allowing a broader spectrum of inventions to meet the technical requirement while never providing a solid legal definition of “technical contribution.”⁴⁴⁷ The concept of “technical,” although central to European patent subject-matter determinations, is a difficult legal concept to define. Scholars,⁴⁴⁸ judges,⁴⁴⁹ and more recently, the EPO president,⁴⁵⁰ have noted that the Technical Board of Appeal tests, arguments, and justifications vary from case to case. Moreover, the meaning of “as such” has been “anyone’s guess during the past two decades.”⁴⁵¹ The scope of what is excluded from patent subject matter based on 52(2) and (3) has progressively narrowed, leading to a more liberal granting of software-related patents, and moving toward an approximation of U.S. practice.⁴⁵²

In its 2009 publication, *Patents for Software? European Law and Practice*, the EPO stated that it “does not grant patents for computer programs (‘software patents’) or computer-implemented business methods that make no such technical contribution.”⁴⁵³ The EPO uses the term “computer-implemented inventions” to describe inventions that involve the use of a computer, a computer network, or a programmable apparatus, with features that are realized by a computer program.⁴⁵⁴ Despite this assertion, a 2000 study indicates that the vast majority of software patent applications up to that time proceeded through the EPO without objection and the vast majority of appeals were granted, provided that the claims were appropriately drafted.⁴⁵⁵ According to the EPO, computer-implemented inventions—whether claimed to a physical product or apparatus or to a process or method—are patentable so long as they involve an “inventive technical contribution to the prior art.”⁴⁵⁶ In addi-

⁴⁴⁶ See *id.*

⁴⁴⁷ See *id.*

⁴⁴⁸ See *id.* at 30; Aharonian, *supra* note 361, at pt. 3.

⁴⁴⁹ See *Aerotel*, [2007] 1 All E.R. at 232.

⁴⁵⁰ *Referral by the President of the European Patent Office*, [2009] O.J.E.P.O. at 144–45. Aharonian characterizes the various definitions of technical as “pornographic,” or “I know it when I see it.” Aharonian, *supra* note 361, at pt. 3.

⁴⁵¹ Shemtov, *supra* note 7, at 507.

⁴⁵² See BERESFORD, *supra* note 356, at v; Kretschmer, *supra* note 429, at 9–11.

⁴⁵³ PATENTS FOR SOFTWARE?, *supra* note 356, at 3.

⁴⁵⁴ *Id.*; Shemtov, *supra* note 7, at 507.

⁴⁵⁵ BERESFORD, *supra* note 356, at v (explaining that in some cases, patents were granted after amending the wording of the claims to meet the requirements of the EPC and implementing regulations). Beresford’s book has been characterized as the “leading study” on patenting under the EPC. Kretschmer, *supra* note 429, at 12–13.

⁴⁵⁶ PATENTS FOR SOFTWARE?, *supra* note 356, at 10.

tion, the EPO will grant claims to “computer program” products, such as those stored on some kind of a carrier like a CD or DVD, provided they cause a “further technical effect” beyond the “normal physical effects,” such as the flow of electric current through a computer.⁴⁵⁷

EPO computer software patent subject-matter decisions have shaped European law concerning business methods.⁴⁵⁸ Nevertheless, business method examinations produce results that are markedly different from similar examinations of non-business related computer programs.⁴⁵⁹ Very few computer-implemented business methods are successfully prosecuted in Europe.⁴⁶⁰ The EPO has recently stated that computer programs that “implement business, mathematical or similar methods and do not produce technical effects (e.g. because they solve a business problem rather than a technical one) are not patentable.”⁴⁶¹ Although the EPO considers technical innovations associated with business methods, it does not conduct searches of business method art.⁴⁶²

1. The Technical Contributions Approach

The 1987 decision *Vicom/Computer Related Invention*,⁴⁶³ the first Technical Board of Appeal 3.5.01 decision concerning computer-implemented inventions, is still central to the meaning of the term “technical effect” in Europe.⁴⁶⁴ The *Vicom* Board considered whether a CAD program—a mathematical method⁴⁶⁵ for improving digital images by increasing processing speed—or a machine for carrying out the method were excluded from patentability “as such.”⁴⁶⁶ Following EPO Ex-

⁴⁵⁷ *Id.* at 11.

⁴⁵⁸ See CORNISH & LLEWELYN, *supra* note 18, at 829.

⁴⁵⁹ See BERESFORD, *supra* note 356, at 183.

⁴⁶⁰ Nicholas Fox & Alex Rees, *A European Perspective on Business Method Patents*, LANDSLIDE, July/August 2010 at 30, 30 (confirming that the examining division dealing with business methods currently rejects approximately 95–97% of the applications).

⁴⁶¹ PATENTS FOR SOFTWARE?, *supra* note 356, at 12.

⁴⁶² GREGORY A. STOBBS, BUSINESS METHOD PATENTS §14.03[A] (Supp. 2004). Fox & Rees assert that the applications for the three to five percent of business method patents granted have avoided classification as a business method, emphasizing technical advantages and minimizing business benefits. Fox & Rees, *supra* note 460, at 35–37.

⁴⁶³ Case T-208/84, *Computer-Related Invention/VICOM*, [1987] O.J.E.P.O. 14 (Technical Bd. Appeal 3.5.01, July 15, 1986) available at http://archive.epo.org/epo/pubs/oj1987/p001_046.pdf.

⁴⁶⁴ LEITH, *supra* note 370, at 27.

⁴⁶⁵ *VICOM*, [1987] O.J.E.P.O. at 14. The EPO cases are more likely to use the term “method,” whereas U. S. cases use “process,” as a result of differing statutory language. See EPC 2000, *supra* note 14, art. 52(2) (a); 35 U.S.C. § 100(b).

⁴⁶⁶ *VICOM*, [1987] O.J.E.P.O. at 14.

amination Guidelines in place at the time, the examiners had rejected the claim as a mathematical method “as such.”⁴⁶⁷ The Technical Board of Appeal, which was not bound by the Examination Guidelines, found the method to qualify as patent subject matter and not be excluded “as such.”⁴⁶⁸

In delineating the difference between an excluded mathematical method or algorithm and a technical process, the Technical Board of Appeal stated that a mathematical method produced no direct technical result, being “an abstract concept prescribing how to operate on the numbers.”⁴⁶⁹ But, the Board went on to note:

[I]f a mathematical method is used in a technical process, that process is carried out on a physical entity (which may be a material object but equally an image stored as an electric signal) by some technical means implementing the method and provides as its result a certain change in that entity.⁴⁷⁰

Further, the Board of Appeal noted, “[t]he technical means might include a computer comprising suitable hardware or an appropriately programmed general purpose computer.”⁴⁷¹ As one scholar observed, “[t]he Board held that where the claims relate to a technical process, patentability may arise from novelty in the mathematical algorithm employed for a technical benefit, and it was immaterial whether the algorithm was to be implemented in hardware or software.”⁴⁷²

The Board’s reasoning failed to provide clarity. The Technical Board of Appeal explained that even if the idea for the invention resides in the non-patentable mathematical method, the applicant will not be considered to seek protection for the mathematical method “as such” so long as the claim is directed to a technical process in which the method is used.⁴⁷³ The most oft-quoted Reason for the Decision provides:

Generally speaking, an invention which would be patentable in accordance with conventional patentability criteria should not be excluded from protection by the mere fact that for its implementation modern technical means in the form of a computer program are used. *Decisive is what technical contribu-*

⁴⁶⁷ *Id.*

⁴⁶⁸ *See id.*

⁴⁶⁹ *See id.*

⁴⁷⁰ *Id.*

⁴⁷¹ *Id.*

⁴⁷² BERESFORD, *supra* note 356, at 24; *see VICOM*, [1987] O.J.E.P.O. at 20.

⁴⁷³ *VICOM*, [1987] O.J.E.P.O. at 19.

*tion the invention as defined in the claim when considered as a whole makes to the known art.*⁴⁷⁴

Vicom established the importance of the overall technical contribution of the invention as the baseline for examining computer-related inventions. This remains European law.⁴⁷⁵ Under *Vicom*, the invention as a whole must provide some technical contribution over the state of the art to be considered an invention within the meaning of Article 52.⁴⁷⁶ The overall reasoning is similar to the holistic approach taken in the 1981 U.S. Supreme Court decision *Diamond v. Diehr*, which produced a similar result.⁴⁷⁷

The Technical Board of Appeal remitted the claim back to the examiners, holding that “[a] claim directed to a technical process which process is carried out under the control of a program (whether by means of hardware or software), cannot be regarded as relating to a computer program *as such*.”⁴⁷⁸ Before the Board, *Vicom* had agreed to amend its original patent claims to a multipurpose algorithm and a method of digital filtering, and to direct the claims more specifically to the processing of digital images.⁴⁷⁹ Applying *Vicom*’s technical contribution approach, the examiner allowed the amended and limited claims because they were amended for “the general functioning of the computer, rather than to an application designed to execute particular tasks.”⁴⁸⁰ In taking this holistic approach, the form of the patent claim is not important; the examiner should “disregard the form or kind of claim and concentrate on its content in order to identify the contribution which the subject-matter claimed, considered as a whole, adds to the known art.”⁴⁸¹ As one scholar has noted, “[n]o distinction should be drawn between implementation of a computational task in software or in hardware since this does not affect the inventive concept.”⁴⁸² Another scholar adds that if the “contribution is not of a technical character (i.e. if it falls exclusively within one of the excluded areas), then there is no

⁴⁷⁴ *Id.* at 21–22 (emphasis added).

⁴⁷⁵ LEITH, *supra* note 6, at 28–29.

⁴⁷⁶ CIPA *supra* note 400, § 18A.4.1.

⁴⁷⁷ *Diamond v. Diehr*, 450 U.S. 175, 188 (1981) (reasoning that an industrial claim that employed a well-known mathematical algorithm was patentable even if the non-computer-related aspects of the process were well known in the art).

⁴⁷⁸ *VICOM*, [1987] O.J.E.P.O. at 14.

⁴⁷⁹ Kretschmer, *supra* note 429, at 8.

⁴⁸⁰ CORNISH & LLEWELYN, *supra* note 18, at 824; *see* Kretschmer, *supra* note 429, at pt. 2.5.

⁴⁸¹ Shemtov, *supra* note 7, at 507.

⁴⁸² de Mauny, *supra* note 7, at 147.

invention.”⁴⁸³ *Vicom* opened the door to computer-related inventions being patentable “within the realms of computer science.”⁴⁸⁴

Vicom stands for the proposition that subject matter for controlling or carrying out a technical process is patentable, regardless of whether it is implemented on hardware or software.⁴⁸⁵ The involvement of a computer program is not sufficient grounds to deny patentability.⁴⁸⁶ Although the Technical Board of Appeal drew a line concerning “technical contributions” in *Vicom*, its reasoning is not compelling. The Board used the term “technical” sixteen times without defining it; likewise, it used the term technical “features” twice,⁴⁸⁷ technical “process” on six occasions,⁴⁸⁸ technical “means” on four occasions,⁴⁸⁹ and technical “subject matter,” “result,” “considerations,” and “contribution” once each.⁴⁹⁰ The Technical Board of Appeal neither identified the particular technical contribution made by the invention in *Vicom*, nor did it discuss the exact nature of that technical contribution. Thus, after *Vicom*, the meaning of technical contribution remained “a little elusive.”⁴⁹¹

In 1987, the same year as *Vicom*, the second leading Technical Board of Appeal decision, *Koch & Sterzel*, appeared. *Koch & Sterzel* concerned a patent claim to the use of a computer program to control an X-ray machine to ensure optimal performance without overloading the X-ray tube.⁴⁹² In the opposition to this claim, Siemens and Philips argued that the only difference between the claim’s subject matter and the state of the art was the use of a new program for a known computer.⁴⁹³ The essence of the invention was a computer program that only produced a technical effect at the very end of the computing operation.⁴⁹⁴ Because the invention involved both a mathematical method in the form of a computer program and a technical apparatus, the op-

⁴⁸³ Shemtov, *supra* note 7, at 507.

⁴⁸⁴ Kretschmer, *supra* note 429 at pt. 2.5. For example, procedures at the operating system level to improve machine functionality or generic algorithms at the application level would normally be patentable. *Id.*

⁴⁸⁵ *VICOM*, [1987] O.J.E.P.O. at 14; PATENTS FOR SOFTWARE?, *supra* note 356, at 11.

⁴⁸⁶ PATENTS FOR SOFTWARE?, *supra* note 356, at 11.

⁴⁸⁷ *VICOM*, [1987] O.J.E.P.O. at 14, 16.

⁴⁸⁸ *Id.* at 14, 19.

⁴⁸⁹ *Id.* at 19–21.

⁴⁹⁰ *Id.* at 18–19, 21.

⁴⁹¹ *Aerotel*, [2007] 1 All E.R. at 249.

⁴⁹² Case T-26/86, X-ray Apparatus/KOCH & STERZEL, [1988] O.J.E.P.O. 19, 22 (Technical Bd. Appeal 3.4.1, May 21, 1987), *available at* http://archive.epo.org/epo/pubs/oj1988/p001_080.pdf.

⁴⁹³ *Id.*

⁴⁹⁴ *Id.*

ponents argued that the X-ray apparatus and the computer program had to be considered separately for purposes of determining whether the claim involved an invention.⁴⁹⁵ The opposition cited the German Federal Court of Justice, which ruled as follows:

[A teaching in a claim is not technical if] in its essence it states a rule that can be carried out without employing controllable natural forces other than human brainpower, even if the use of a technical means appears expedient or indeed the only sensible and hence the necessary procedure, and even if reference is made to these technical means in the claims or description.⁴⁹⁶

The Technical Board of Appeal rejected this approach and drew a line of distinction between unpatentable computer programs on general purpose computers, in which the electrical signals produced amounted to no more than a reproduction of the information, and those that technically altered the functioning of the unit, which may be patentable.⁴⁹⁷ Affirming *Vicom*, the Technical Board of Appeal held that the invention must be assessed as a whole, because the EPC does not prohibit patenting of inventions consisting of a mix of both technical and non-technical means.⁴⁹⁸ Further, the Board held that there need not be a constant interaction between the program and the apparatus: “[w]hen the technical effect occurs is irrelevant to the question of whether the subject matter claimed constitutes an invention under Article 52(1) EPC. The only fact of importance is that it occurs at all.”⁴⁹⁹

Therefore, under the technical contribution approach, it does not matter that the contribution to the prior art is a mathematical algorithm so long as there is a technical effect in the apparatus beyond the normal functioning of the computer.⁵⁰⁰ Neither the magnitude of the effect, nor the point in the process at which the effect occurred, are determinative.⁵⁰¹ This reasoning is analogous to the line of reasoning used in *Diehr*, which concluded that it was erroneous to take a point of novelty approach.⁵⁰² Rather, if the invention as a whole is different from

⁴⁹⁵ *Id.* at 21.

⁴⁹⁶ *Id.* at 22–23.

⁴⁹⁷ *Id.* at 23.

⁴⁹⁸ *KOCH & STERZEL*, [1988] O.J.E.P.O. at 24.

⁴⁹⁹ *Id.* at 22–23.

⁵⁰⁰ *Id.* at 24.

⁵⁰¹ *See id.* at 22–23, 24.

⁵⁰² *See* 450 U.S. at 189.

the prior art, it is irrelevant that the source of novelty resides entirely in a mathematical algorithm or computer program.⁵⁰³ The *Diehr* dissent had predicted that this approach would open the floodgates to the patentability of computer software.⁵⁰⁴ Indeed, patenting strategy in the United States shifted towards “indirect drafting” of software claims following *Diehr*, subverting the algorithm exclusion to practical nullity.⁵⁰⁵ One commentator has observed that the USPTO Guidelines acknowledged the practice, providing that “the utility of an invention must be within the ‘technological’ arts. A computer-related invention is within the technological arts.”⁵⁰⁶ Thus, the novelty of a patent claim may arise in the software itself, not only through some physical transformation brought about by software.⁵⁰⁷ The EPO developed a similar approach post-*Vicom*.⁵⁰⁸

2. The Further Technical Effect Approach

Toward the end of the 1990s, the technical contribution approach met criticism.⁵⁰⁹ Applicants claimed that when software is run on a computer, there is always a machine involved and the invention was, therefore, automatically technical.⁵¹⁰ Another problem emerged. *Vicom* and *Koch & Sterzel* dealt with apparatus claims and process or methods claims.⁵¹¹ The EPO still disallowed direct patent claims to “computer program products,” or software.⁵¹² This created an enforcement issue. The only way to infringe a process or method patent on a computer system solution in Europe was to run the patented program directly.⁵¹³

⁵⁰³ See *id.* at 183.

⁵⁰⁴ See *id.* at 218 (Stevens, J., dissenting).

⁵⁰⁵ Kretschmer, *supra* note 429, at pt. 2.5.

⁵⁰⁶ *Id.* (citing Examination Guidelines for Computer-Related Inventions, 61 Fed. Reg. 7478, 7479 (Feb. 28, 1996)).

⁵⁰⁷ See *id.*

⁵⁰⁸ *Id.*

⁵⁰⁹ Steinbrenner, *supra* note 437, at 37.

⁵¹⁰ Laub, *supra* note 7, at 348.

⁵¹¹ *KOCH & STERZEL*, [1988] O.J.E.P.O. at 19 (involving the patenting of inventions consisting of a mix of technical and non-technical features); *VICOM*, [1987] O.J.E.P.O. at 14 (involving a claim by which a technical process is considered to reside in a mathematical method).

⁵¹² See EPC 2000, *supra* note 14, art. 52(2)(c) (barring computer programs from consideration as inventions eligible for patents).

⁵¹³ But see Directive of the European Parliament and of the Council on the Patentability of Computer-Implemented Inventions, EUR. PARL. DOC. (COM 92) 27 (2002), available at <http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2002:0092:FIN:EN:PDF> (proposing that a computer program infringes only if it fulfills a certain patented function in the way defined in the patent claim).

Unlike the patent on the hardware component of the invention, putative infringers copying and distributing the process could only be liable for indirect infringement, a much more difficult claim.⁵¹⁴

In 1997, an IBM appeal clarified the issue concerning direct claims to computer software and articulated what became known as the “further technical effect” approach.⁵¹⁵ *IBM/Computer Program Product* involved a method claim and claims directed to “computer program products directly loadable into the memory of the computer” and to a “computer program product stored on a computer usable medium.”⁵¹⁶ In a second unreported case decided by the Technical Board of Appeal at the same time, IBM appealed an EPO examining division decision refusing a patent application for a computer program.⁵¹⁷ Following EPO Examination Guidelines in place at the time, the examining division refused the computer program products claims, drawing a clear line between patentable and unpatentable subject matter by disallowing the computer program products claim to preclude the possibility of a program written on a sheet of paper from patentability.⁵¹⁸ The Technical Board of Appeal did not agree and considered whether and under which circumstances a computer program product could be valid subject matter.⁵¹⁹

The Board in *IBM I* interpreted the language of the EPC to mean that the drafters had not intended to exclude all computer programs from patentability, but only computer programs “as such.”⁵²⁰ Because computer programs must be patentable when they have a technical character, not all computer programs are *prima facie* excluded from patentability.⁵²¹ In delineating between patentable and non-patentable programs, the Technical Board of Appeal again excluded from patentability programs causing common physical modifications to the

⁵¹⁴ Steinbrenner, *supra* note 437, at 62.

⁵¹⁵ See Case T-1173/97, *Computer Program Product/IBM (IBM I)*, [1999] O.J.E.P.O. 609, 620 (Technical Bd. Appeal 3.5.01, Jul. 1, 1998), available at http://archive.epo.org/epo/pubs/oj99/10_99/10_6099.pdf.

⁵¹⁶ *Id.* at 610, 611.

⁵¹⁷ See Case T-935/97, *IBM/Computer Programs (IBM II)*, [1999] E.P.O.R. 301, 303 (Technical Bd. Appeal 3.5.01, Feb. 4, 1999), available at <http://www.epo.org/law-practice/case-law-appeals/pdf/t970935eu1.pdf>.

⁵¹⁸ See *id.*

⁵¹⁹ See *id.* at 309. One commentator even suggests that IBM colluded with the EPO by drafting its claims for direct patentability of the computer program, and not indirectly to a system or method for inventions that would have “clearly” been patentable as method claims in line with previous EPO decisions. See Kretschmer, *supra* note 429, § 2.5.

⁵²⁰ See *IBM I*, [1999] O.J.E.P.O. at 618–19.

⁵²¹ See *id.* at 619.

computer, such as electrical currents carrying out program instructions.⁵²² The Board of Appeal held that a computer program may not be excluded from patentability “[i]f the program, when running on a computer or loaded into a computer, brings about, or is capable of bringing about, a technical effect which goes beyond the ‘normal’ physical interactions between the program (software) and the computer (hardware on which it is run).”⁵²³ The Board found that the technical character in the “further effects” derived from the hardware’s execution of the instructions given by the computer program.⁵²⁴ This further technical effect beyond the normal functioning of the computer may occur when the software manages an industrial process or the working of a machine.⁵²⁵ A “further technical effect” also occurs in cases where the computer is a necessary means to obtain the further technical effect,⁵²⁶ although the Board neither defined nor provided examples of when a computer might provide the necessary means.⁵²⁷ In reaching its decision, the Technical Board of Appeal cited *Vicom*’s reasoning that it was illogical to grant a patent for the process, but not for the apparatus for carrying out the method.⁵²⁸ The *IBM I* Board utilized the reasoning of *Vicom* in concluding as follows:

[It would be illogical to] grant a patent for both a method and the apparatus adapted for carrying out the same method, but not for the computer program product, which comprises all the features enabling the implementation of the method and which, when loaded in a computer, is indeed able to carry out that method.⁵²⁹

The Board distinguished its holding from the practice in U.S. and Japanese patent offices, which allow patent claims to computer

⁵²² See *id.* at 620.

⁵²³ *Id.* at 632 (emphasis added). The Technical Board of Appeal defined “running on a computer” to mean that “the system comprising the computer program plus the computer carries out a method or process.” *Id.* “Loaded into a computer,” according to the Board, means that the programmed computer is capable of carrying out a method that constitutes a system, device, or apparatus. *Id.* Professor Kretschmer characterizes this reasoning concerning further technical effect as “sailing close to the wind” and puts the reasoning in plainer language: “software is not a computer program ‘as such’ if it is innovative and it works.” See Kretschmer, *supra* note 429, § 2.5.

⁵²⁴ *IBM I*, [1999] O.J.E.P.O. at 620.

⁵²⁵ *Id.*

⁵²⁶ *Id.* at 620–21.

⁵²⁷ See *id.*

⁵²⁸ *VICOM*, [1987] O.J.E.P.O. at 21–22.

⁵²⁹ *IBM I*, [1999] O.J.E.P.O. at 626.

programs, acknowledging that while these foreign practices represented a “useful indication of modern trends,” those legal systems did not contain exclusions to patentability similar to those in Articles 52(2) and (3).⁵³⁰

Prior to *IBM I*, the EPO had focused on putting computer-implemented inventions into the framework of tangible, physical machines.⁵³¹ After *IBM I*, the focus shifted to the nebulous “further technical effect” caused by the computer program.⁵³² One scholar suggests that this transition provides evidence that the Board changed from its previous machine metaphor to an analogy that the software itself is “machine-like” and that the Board thus “dropped the fiction that a patentable invention was in the machine which was part hardware and part software.”⁵³³ Nevertheless, the *IBM I* case narrowed the scope of the exclusion so that more inventions achieved patentability. The requirement of a “further technical effect” is not a bar to patentability: “[a]ny computer program that works is not a computer program” as such if a carefully drafted claim refers to technical considerations.⁵³⁴

Despite the Board’s statement to the contrary, it is difficult to avoid speculating that the U.S. treatment of software influenced the EPO to liberalize its treatment of computer program patent validity questions. By the time of the *IBM I* decision, the CAFC had largely removed patent subject-matter restrictions with respect to computer software and business methods.⁵³⁵ In light of this real or apparent pressure, it is not surprising that the EPO may have been motivated to loosen constraints in order to allow European inventors to compete more evenly with U.S. inventors.

Ultimately, the reasoning in *IBM I* is unsatisfying and does little to advance the meaning of either technical contribution or the boundaries of the “as such” exception. The circular reasoning that computer programs “as such” are not patentable because they are not technical, and that programs with technical character are valid patent subject matter because they are not programs “as such,” is not illuminating. Without further articulating the nature of the “further technical effect” test, the *IBM I* decision failed to delineate the exact nature and scope

⁵³⁰ See *id.* at 617.

⁵³¹ See LEITH, *supra* note 6, at 29–31.

⁵³² See *id.* at 33.

⁵³³ *Id.* at 32–33.

⁵³⁴ Grosche, *supra* note 359, at 273.

⁵³⁵ See *Diehr*, 450 U.S. at 177–78; *State St. Bank & Trust Co. v. Signature Fin. Grp. Inc.*, 149 F.3d 1368, 1373 (Fed. Cir. 1998).

of the computer program exclusion.⁵³⁶ To many, *IBM I* formally ended the computer program exclusion in the EPC and the fiction of a limitation based on technical character, technical contribution, or technical effect.⁵³⁷

3. The Any Hardware Approach

Until 2000, the EPO applied three concepts in evaluating the patent eligibility of computer-implemented inventions: first, there must be a technical contribution (*Vicom*); second, in determining technicality, the invention must be evaluated as a whole (*Koch & Sterzel*); and third, the contribution must cause a further technical effect (*IBM*).⁵³⁸ In 2000, however, the EPO clearly departed from requiring a technical contribution as part of the Article 52 analysis in a series of cases beginning with *PBS Partnership*.⁵³⁹

PBS, decided one year after *IBM I*, did not involve a patent claim to a computer program, but claimed a method and an apparatus, where the apparatus was a computer programmed to run the method.⁵⁴⁰ The method used data processing to control pension benefit programs for subscriber employers by using standard factors, such as actuarial life spans, for calculating pensions.⁵⁴¹ The Technical Board of Appeal denied the method claim as a method for doing business “as such,” and accordingly, relied on Article 52(2) and (3) to preclude the claim.⁵⁴² The Board acknowledged the technical effects test and found that all of the steps involved in processing and producing the information had a “purely administrative, actuarial and/or financial character.”⁵⁴³ It rejected the appellant’s argument that referring to data processing and computing means in the claims conferred technical character on the

⁵³⁶ See LEITH, *supra* note 6, at 33.

⁵³⁷ See Kretschmer, *supra* note 429, § 2.5. Nevertheless, Beresford’s work demonstrates that the exclusions on patentability under the EPC were almost equivalent to United States practice by 2000, and that the “technical effect” criterion, which applies to all EPO examinations, could be met with careful drafting of claims. *Id.* Under EPO practice, most innovative software includes a technical effect, such as higher speed, more economical use of memory, or an improved user interface. *Id.* § 3.1

⁵³⁸ See Laub, *supra* note 7, at 349; see also *IBM I*, [1999] O.J.E.P.O. at 620; *KOCH & STERZEL*, [1988] O.J.E.P.O. at 24; *VICOM*, [1987] O.J.E.P.O. at 21–22.

⁵³⁹ See Case T-931/95, Controlling Pension Benefit Systems Partnership/PBS PARTNERSHIP, [2001] O.J.E.P.O. 441, 448 (Technical Bd. Appeal 3.5.01, Sept. 8, 2000) available at http://archive.epo.org/epo/pubs/oj001/10_01/10_4411.pdf.

⁵⁴⁰ See *id.* at 441–42.

⁵⁴¹ See *id.* at 445.

⁵⁴² *Id.* at 449.

⁵⁴³ *Id.*

method, and concluded that “[a] feature of a method which concerns the use of technical means for a purely nontechnical purpose and/or for processing purely non-technical information does not necessarily confer a technical character to such a method.”⁵⁴⁴ There is nothing in *PBS*’s holding regarding the method claim that departed from previous EPO cases.⁵⁴⁵

By contrast, the Board treated the apparatus claim differently, signaling a “substantial departure from previous case law.”⁵⁴⁶ The Technical Board of Appeal found that an apparatus programmed for use in a particular field was an invention within the meaning of Article 52(1), even if the field was business, because it involved a physical entity.⁵⁴⁷ If the patent claim was directed to the apparatus, the formal category of the claim implied physical features which could qualify as technical features of the invention.⁵⁴⁸ Therefore, use of any physical entity would bring the claim outside the Article 52(2) and (3) exclusions.⁵⁴⁹ Lord Justice Jacob in *Aerotel* coined the descriptive nomenclature “any hardware” to refer to this approach.⁵⁵⁰

The *PBS* reasoning appears formalistic rather than substantive. Article 52(2)(c) excludes “methods” of doing business, but not “apparatuses” or “products.”⁵⁵¹ Although the claim proceeded as an Article 52 invention, the Technical Board of Appeal ultimately found that the apparatus was nonetheless not patent subject matter because it did not meet the requirements of “inventive step” under Article 56.⁵⁵² In making this determination, the Board found no non-obvious improvement over the identified prior art of “existing private pension plans,” because the improvement was essentially economic and not technical.⁵⁵³ The

⁵⁴⁴ *Id.* at 450.

⁵⁴⁵ See *Aerotel*, [2007] 1 All E.R. at 264–65 (noting an English judge’s observation that “it [would be] difficult to think of a concrete case where the approaches [in *VICOM* and *PBS*] would lead to a different result, but . . . they could.”).

⁵⁴⁶ See *id.* at 264 (“Thus far there is nothing remarkable about [*PBS*]. It is the reasoning in relation to the apparatus claim which represented a substantial departure from previous case law.”).

⁵⁴⁷ See *PBS*, [2001] O.J.E.P.O. at 452.

⁵⁴⁸ See *id.*

⁵⁴⁹ See *id.*

⁵⁵⁰ *Aerotel*, [2007] 1 All E.R. at 237.

⁵⁵¹ See *PBS*, [2001] O.J.E.P.O. at 452.

⁵⁵² See EPC 2000, *supra* note 14, art. 56 (“An invention shall be considered as involving an inventive step if, having regard to the state of the art, it is not obvious to a person skilled in the art.”).

⁵⁵³ See *PBS*, [2001] O.J.E.P.O. at 456.

claimed invention did not provide a technical solution to a technical problem.⁵⁵⁴

Hitachi/Auction Method, the next EPO case decided using the “any hardware” approach, is the more important of the two cases in that it set the standard for EPO examination of business method and business systems patents.⁵⁵⁵ *Hitachi* involved a method claim for the automated auction method, an apparatus claim for running the auction via a network, and a computer program claim.⁵⁵⁶ The *Hitachi* Board, following *PBS*, explained that the technical contribution approach was incorrect in that an invention’s technical contribution was more appropriately considered for determining novelty and inventive step rather than subject matter.⁵⁵⁷ The *Hitachi* board instructed that “[a] mix of technical and non-technical features may be regarded as an invention within the meaning of 52(1) EPC and that the prior art should not be considered when deciding whether the claimed subject matter is such an invention.”⁵⁵⁸

The *Hitachi* Board found that the apparatus claim was outside of the Article 52 exclusions because it possessed technical features, such as a “service computer,” “client computer,” and “network.”⁵⁵⁹ The claim thus met the requirements of technicality.⁵⁶⁰ This conclusion was consistent with the *PBS* finding that “[a]n apparatus constituting a physical entity or concrete product, suitable for performing or supporting an economic activity is an invention within the meaning of Article 52(1).”⁵⁶¹ In this reasoning, both *Hitachi* and *PBS* depart dramatically from the technical contribution requirements of *Vicom* and *Koch & Sterzel*. Rather than achieving technical character by making a computer run better or faster, the claimed inventions in *Hitachi* and *PBS* achieved technical character by virtue of being loaded onto the ma-

⁵⁵⁴ See *id.* at 456–57.

⁵⁵⁵ Case T-258/03, *Auction Method/HITACHI*, [2004] O.J.E.P.O. 575, 587 (Technical Bd. Appeal 3.5.01, Apr. 21, 2004), available at <http://www.epo.org/law-practice/case-law-appeals/pdf/t030258ex1.pdf> (“Method steps consisting of modifications to a business scheme and aimed at circumventing a technical problem rather than solving it by technical means cannot contribute to the technical character of the subject-matter claimed.”).

⁵⁵⁶ *Id.* at 579.

⁵⁵⁷ *Id.* at 581–82.

⁵⁵⁸ *Id.* at 582.

⁵⁵⁹ *Id.* at 583.

⁵⁶⁰ See *id.*

⁵⁶¹ *PBS*, [2001] O.J.E.P.O. at 451.

chine. Therefore, the claimed inventions escaped classification as a computer program or a business method “as such.”⁵⁶²

Hitachi also changed course from *PBS* in finding that the method claim was not excludable as a business method “as such.”⁵⁶³ The *PBS* Board had found that use of a technical means for purely non-technical purposes did not confer technical character on the method.⁵⁶⁴ A different Technical Board of Appeal panel, roughly forty months after *PBS*, found that it was inappropriate to quantify or weigh the technical aspects of the method claim as part of the Article 52 analysis.⁵⁶⁵ Doing so would require consideration of possible novel or inventive contributions to the prior art, which the Article 52 analysis of invention does not allow.⁵⁶⁶ The *Hitachi* Board mandated that method claims and apparatus claims be treated the same for purposes of Article 52 analysis.⁵⁶⁷ In both instances a physical feature of the entity, or the nature of the activity, could imply technical character.⁵⁶⁸ Therefore, what examiners and practitioners had previously considered a non-technical activity now achieved technical character and could not be dismissed as a non-invention “as such.”⁵⁶⁹ This interpretation of Articles 52(2) and (3) substantially broadened the concept of “invention.” The Technical Board of Appeal acknowledged this expansion, noting that technical acts as familiar as writing with pen and paper would meet its Article 52 technical criteria.⁵⁷⁰ Under the *Hitachi* analysis, then, the first step in determining patentability was whether the claimed subject matter has a *prima facie* technical effect.⁵⁷¹ A business method passes the Article 52 test as long as it is attached to “any hardware.”⁵⁷² But such inventions must also pass the Article 56 inventive step test.

⁵⁶² See *HITACHI*, [2004] O.J.E.P.O. at 583; *PBS*, [2001] O.J.E.P.O. at 453 (“An apparatus constituting a physical entity . . . suitable for performing or supporting an economic activity, is an invention.”).

⁵⁶³ *HITACHI*, [2004] O.J.E.P.O. at 584.

⁵⁶⁴ See *PBS*, [2001] O.J.E.P.O. at 441.

⁵⁶⁵ See *HITACHI*, [2004] O.J.E.P.O. at 584–85.

⁵⁶⁶ *Id.*

⁵⁶⁷ See *id.* at 585 (“[T]he Board . . . is not convinced that the wording of Article 52(2)(c) EPC . . . imposes a different treatment of claims directed to activities and claims directed to entities for carrying out these activities.”).

⁵⁶⁸ *Id.*

⁵⁶⁹ See *id.*

⁵⁷⁰ *Id.*

⁵⁷¹ See Fox & Rees, *supra* note 460, at 32 (“[Following Hitachi,] this initial hurdle is not hard to overcome as the presence of involvement of any physical apparatus is sufficient.”).

⁵⁷² See *HITACHI*, [2004] O.J.E.P.O. at 583; *PBS*, [2001] O.J.E.P.O. at 453.

Article 56 provides that “[a]n invention shall be considered as involving an inventive step if, having regard to the state of the art, it is not obvious to a person skilled in the art.”⁵⁷³ The EPC follows a “problem-and-solution” approach to the inventive step analysis. For there to be an inventive step, there must be an objective technical problem with a technical solution, and the EPC considers whether the claimed invention would have been obvious to a skilled person starting from the closest prior art.⁵⁷⁴ Patent examiners often break this approach into four steps: first, determine the closest prior art;⁵⁷⁵ second, determine the distinguishing technical feature and its technical effect;⁵⁷⁶ third, formulate the objective technical problem;⁵⁷⁷ and fourth, determine whether a skilled person would have solved the technical problem by the solution specified in the patent claim.⁵⁷⁸ The problem-and-solution approach requires analysis of the prior art, but only takes into account features of the invention that contribute to the technical character of the invention.⁵⁷⁹ Thus, it is the second step, technical effect, at which most business methods fail.⁵⁸⁰ The central feature of Hitachi’s auction method automatically increased the auction price if more than one bidder offered the same “desired price.”⁵⁸¹ Although Hitachi argued that the technical effect resided in the claimed invention’s ability to overcome delay between bidders and the server,⁵⁸² the Board found the invention claimed was “a mere automation of the non-technical activity of performing a Dutch auction.”⁵⁸³ The Board also acknowledged that the invention might have contained a technical feature that went beyond how a human auctioneer would perform the auction without technical support.⁵⁸⁴ Because the programming measure required to rank such bids “would have been obvious” to anyone skilled in data

⁵⁷³ EPC 2000, *supra* note 14, art. 56. The EPC’s inventive step is similar to non-obviousness in the United States, although the approaches are different. See Gwilym V. Roberts et al., *Transatlantic Patenting*, LANDSLIDE, Nov./Dec. 2009, at 32, 33.

⁵⁷⁴ See Laub, *supra* note 7, at 349, 360 (comparing the EPO and USPTO approaches to the examination of the patentability of computer-implemented inventions).

⁵⁷⁵ *Guidelines for Examination in the EPO*, *supra* note 414, Part C, ch. IV, § 11.5.

⁵⁷⁶ Fox & Rees, *supra* note 460, at 32.

⁵⁷⁷ *Guidelines for Examination in the EPO*, *supra* note 414, Part C, ch. IV, § 11.5.

⁵⁷⁸ *Id.*

⁵⁷⁹ *HITACHI*, [2004] O.J.E.P.O. at 586–87.

⁵⁸⁰ Fox & Rees, *supra* note 460, at 32.

⁵⁸¹ See *HITACHI*, [2004] O.J.E.P.O. at 588.

⁵⁸² *Id.* at 587.

⁵⁸³ *Id.* at 588.

⁵⁸⁴ *Id.* at 589.

processing, however, the invention did not meet the requirements of an inventive step.⁵⁸⁵

EPO boards have continued to refine their approach. Less than two years after deciding *Hitachi*, the Technical Board of Appeal decided a third case. *Microsoft/Clipboard Formats* involved an appeal from the examining division's refusal of claims to a method that improved the functionality of Windows 3.1, including a computer program to execute the method.⁵⁸⁶ The Technical Board of Appeal set aside the appeal, remitting the claim to the examining division to grant the patent.⁵⁸⁷ Following *Hitachi's* approach that a method using technical means is an invention within the meaning of Article 52, the Board found the clipboard method claim eligible for patent protection because a "computer system including a memory is a technical means."⁵⁸⁸ Rather than moving to the Article 56 analysis, however, the Board took the opportunity to distinguish a patentable method implemented in a computer system from non-patentable programs. The former "represents a sequence of steps *actually* performed and achieving an effect"⁵⁸⁹ while the latter "just have the potential of achieving such an effect when loaded into, and run on, a computer."⁵⁹⁰ The Board further explained that even though a method of operating a computer may use a computer program, a claim to the method is not a claim to the computer program "as such."⁵⁹¹

In applying their reasoning to the claim in question, the *Microsoft* Board delineated their divergent approach. Claim 5 covered a "computer-readable medium having computer-executable instructions (i.e. computer program)" to perform the method.⁵⁹² Citing *Hitachi*, the *Microsoft* Board found that the computer software passed the Article 52 hurdle because it "relates to a computer-readable medium, i.e. a technical product involving a carrier."⁵⁹³ The Board cited *IBM I* to support its finding that:

⁵⁸⁵ *Id.*

⁵⁸⁶ See Case T-424/03, *MICROSOFT/Clipboard Formats I*, [2006] E.P.O.R. 414, 417 (Technical Bd. Appeal 3.5.01, Feb. 23, 2006), available at <http://www.epo.org/law-practice/case-law-appeals/pdf/t030424eu1.pdf>.

⁵⁸⁷ *Id.* at 422.

⁵⁸⁸ *Id.* at 419–20.

⁵⁸⁹ *Id.* at 420.

⁵⁹⁰ *Id.*

⁵⁹¹ *Id.*

⁵⁹² *MICROSOFT*, [2006] E.P.O.R. at 420.

⁵⁹³ *Id.* (finding that the software possessed the technical character necessary under Article 52).

[The] computer-executable instructions have the potential of achieving the . . . further technical effect of enhancing the internal operation of the computer, which goes beyond the elementary interaction of any hardware and software data processing . . . The computer program recorded on the medium is therefore not to be considered a computer program as such.⁵⁹⁴

This conclusion does not follow from *IBM I*, however, because *IBM I* determined that a computer program could not be considered a technical means unless it produced a “further technical effect.”⁵⁹⁵ Thus, *Microsoft* seemed to carve out a *sui generis* category for computer programs.⁵⁹⁶ As one scholar summarized the *Microsoft* holding, “a computer-reusable medium, including a program stored on it, has technical character because the computer-readable medium is a technical product.”⁵⁹⁷

The Technical Board of Appeal subsequently determined that the method claim met the Article 56 requirement of inventive step. Referring to Windows 3.1, the closest prior art, the Board found the method “solves the problem of how to facilitate a data exchange across different data formats, in particular when transferring non-file data.”⁵⁹⁸ The Board never identified the problem-solution approach, but merely concluded that there is a problem, there is a solution, and that the invention “does not derive in an obvious manner from the pre-existing operating system.”⁵⁹⁹ The *Microsoft* Board found that the method thus met the requirement of inventive step because the method “solves the problem of how to facilitate a data exchange across different data formats.”⁶⁰⁰ The Board also found that the method met the novelty requirement.⁶⁰¹ The Board noted that the method “solve[d] a technical problem by technical means . . . in order to enhance the internal operation of a computer.”⁶⁰²

Although *Microsoft* followed *PBS* and *Hitachi* in the “any hardware” approach to Article 52 analysis, it departed in its Article 56 analysis of inventive step. The *Microsoft* Board did not treat the computer program

⁵⁹⁴ *Id.*

⁵⁹⁵ See *IBM I*, [1999] O.J.E.P.O. at 621.

⁵⁹⁶ Steinbrenner, *supra* note 437, at 66.

⁵⁹⁷ *Id.*

⁵⁹⁸ *MICROSOFT*, [2006] E.P.O.R. at 421.

⁵⁹⁹ *Id.* at 421–22.

⁶⁰⁰ *Id.*

⁶⁰¹ *Id.* at 421.

⁶⁰² *Id.* at 420.

as excludable prior art, as the business methods had been in the previous cases.⁶⁰³ The Technical Board of Appeal examined the computer program along more conventional lines without explaining why the approach was different.⁶⁰⁴ Without explaining what made the method and computer claims different from those in *PBS* and *Hitachi*, the Technical Board of Appeal directed the Examining Board to grant the patent.⁶⁰⁵ This order “opens the way to the patentability in principle of any computer program in Europe,”⁶⁰⁶ and indeed, the Technical Board of Appeal and national courts have recently moved in this direction.⁶⁰⁷ The difference in analysis and results in the recent “any hardware” trilogy of Technical Board decisions depends on whether the prior art is a “business method,” as in *PBS* and *Hitachi*,⁶⁰⁸ or a computer program, as in *Microsoft*.⁶⁰⁹ Although neither is excluded from patentability “as such” if they are present on any hardware, there appears less hostility to the patentability of computer programs than to business methods.⁶¹⁰ Thus, the Technical Board of Appeal provided a much higher exclusionary bar for business methods under Article 56.⁶¹¹ Nonetheless, even with this refinement, subject-matter boundaries remained unclear.

Confusion persisted after *Microsoft. Duns Licensing*, decided months after *Microsoft*, is significant not only for applying the any hardware test, but for addressing differences between the EPO and English Court of Appeal approaches to the “technical” requirement.⁶¹² *Duns Licensing* claimed a research method of estimating sales activity by correlating sales activities at reporting outlets according to certain criteria, and claimed an apparatus for maintaining inventory based on the method’s results.⁶¹³ The Technical Board of Appeal articulated the EPO’s pro-

⁶⁰³ See *id.* at 420–21.

⁶⁰⁴ Ballardini, *supra* note 7, at 567.

⁶⁰⁵ *MICROSOFT*, [2006] E.P.O.R. at 422.

⁶⁰⁶ Ballardini, *supra* note 7, at 567.

⁶⁰⁷ See Steinbrenner, *supra* note 437, at 66 (citing a number of cases in which computer programs have been patented, including software to control a car radio module—the only case to meet the prior art hurdle—a garbage collection in a computer memory, and a data retrieval method).

⁶⁰⁸ See Ballardini, *supra* note 7, at 566–67.

⁶⁰⁹ See *id.* at 567.

⁶¹⁰ See *id.* (claiming that the scope of patent protection for computer programs has narrowed to the requirement of technicality).

⁶¹¹ See EPC 2000, *supra* note 14, art. 56; Fox & Rees, *supra* note 460, at 32.

⁶¹² *DUNS LICENSING*, [2008] O.J.E.P.O. at 70–71 (showing EPO characterizing the divergent U.K. software subject matter approach as “not consistent with a good-faith interpretation of the European Patent Convention” in part because the U.K. approach relied on the technical contribution approach that the EPO had previously abandoned).

⁶¹³ See *id.* at 51–52, 54.

patent approach, stating that Article 52(1) presents the “fundamental maxim of the general entitlement to patent protection for any invention in all technical fields.”⁶¹⁴ The Board continued on to explain that EPC 52(2) and (3) embody the technical character requirement. Despite acknowledging that Article 52 presented interpretive problems because there was no legal or commonly accepted definition of “invention,”⁶¹⁵ the Board insisted that by not defining “invention” the EPO had allowed new technologies to develop.⁶¹⁶

Reviewing the legislative history of EPC 52(2), the *Duns Licensing* Technical Board of Appeal found that the EPC introduced Article 52(3) to prevent a broad interpretation of Article 52(2) excluded matter.⁶¹⁷ The Board considered the revised language in Article 52 in EPC 2000—requiring examiners to grant patents “in all fields of technology”—as expressly confirming technical character as a legal requirement for an invention.⁶¹⁸ Citing the Basic Proposal for EPC 2000, the Board asserted that claimed subject matter is reserved for inventions “with ‘technical character’ or to be more precise—[inventions that] involve a ‘technical teaching’, i.e. an instruction addressed to a skilled person as to how to solve a particular technical problem using particular technical means.”⁶¹⁹ In the same paragraph, the Board emphasized that creations in engineering and technology are entitled to protection under the EPC.⁶²⁰

The *Duns Licensing* Board then explained the relationship between the Article 52 and Article 56 tests. The first question is whether the claimed subject matter meets the Article 52 requirements for invention.⁶²¹ This analysis should be “strictly separated from and not mixed up with” the other patentability requirements, including inventive step.⁶²² When evaluating claims with a mix of technical and non-technical features, Article 56—the inventive step requirement—is key to distinguishing between valid patent subject matter and claims not

⁶¹⁴ *Id.* at 62.

⁶¹⁵ *Id.* at 60, 62.

⁶¹⁶ *See id.* at 62 (“[T]he EPO has not developed any such explicit definition . . . for good reasons.”).

⁶¹⁷ *Id.* at 63.

⁶¹⁸ *DUNS LICENSING*, [2008] O.J.E.P.O. at 62.

⁶¹⁹ *Id.* at 65.

⁶²⁰ *Id.* at 64.

⁶²¹ *See id.* at 67 (quoting an earlier decision where the Technical Board of Appeal first determined whether the claim constituted an invention within the meaning of Article 52(1)).

⁶²² *Id.* at 68.

entitled to patent protection.⁶²³ Only technical features of a claimed invention are relevant when assessing inventive step because the innovation must be in a technical field, not in an unpatentable field.⁶²⁴

Based on this framework, the *Duns Licensing* method claim failed the Article 52 analysis. The Board determined that “gathering and evaluating data as part of a business research method do not convey technical character to the business research method if such steps do not contribute to the technical solution of a technical problem.”⁶²⁵ The method claim had referred to a database, which did not confer technical character because it was not a technical system.⁶²⁶ Therefore, it did not solve a technical problem and the claim was not eligible for patent protection.⁶²⁷ The Technical Board of Appeal was explicit in its conclusion that business research activities do not solve a technical problem related to a technical field: “interaction with and exploiting information about the physical world belongs to the very nature of any business” and accepting those features as technical would “render the exclusion for business methods under Article 52(2) (c) EPC meaningless.”⁶²⁸

The *Duns Licensing* analysis differed in addressing the claim to a central processor to perform the individual steps of the method.⁶²⁹ The Board concluded, without analysis, that under *Hitachi* the claim to the technical apparatus qualified it as an Article 52 invention.⁶³⁰ In line with *Hitachi*, however, the claim failed on the inventive step analysis. The Board found that the new algorithm used and the method of estimating sales activity on a known system were “part of a business research method and do not contribute to the solution of any technical problem.”⁶³¹ Therefore the examiner should not consider such methods in assessing inventive step because they were inherently non-technical, as well as being known.⁶³²

These cases illustrate both the difficulty in drawing a line in the patent subject-matter sands, and the shifting of the line when applying

⁶²³ See *id.* at 61 (stating principles of patentability, one of which is that an “inventive step” can only be based on technical features and that non-technical features “as such” do not provide a technical contribution and are ignored when assessing the “inventive step” element of the analysis).

⁶²⁴ See *DUNS LICENSING* [2008] O.J.E.P.O. at 61, 65, 73–74.

⁶²⁵ *Id.* at 46.

⁶²⁶ *Id.* at 75–76.

⁶²⁷ *Id.*

⁶²⁸ *Id.* at 75.

⁶²⁹ *Id.* at 76.

⁶³⁰ *DUNS LICENSING*, [2008] O.J.E.P.O. at 76.

⁶³¹ *Id.* at 78.

⁶³² See *id.* at 77–78.

the “technical” requirements test. More than two decades of patent case law demonstrate that the technical character tests draw a somewhat arbitrary line.⁶³³ The primary reason to stick to the requirement of technicality appears to be that it has “always existed in Europe.”⁶³⁴ Nevertheless, considerable consensus exists that the rule in Europe is nebulous and that clarification is needed.⁶³⁵

The EPO, in seeking to define the relevant criteria for determining patent subject matter, began by focusing its Article 52 analysis on whether there is an invention and whether that invention is technical in nature and makes a technical contribution.⁶³⁶ The EPO then changed course, with claimed inventions perfunctorily passing the technicality requirement under Article 52 if the claim explicitly included any hardware.⁶³⁷ Evaluation of technicality shifted to the problem-and-solution approach under the Article 56 inventive step analysis.⁶³⁸ Difficulty in defining the terms “technical contribution” and “as such” has resulted in various and inconsistent approaches which have undermined predictability in the field, as the “any hardware” approach has shown.⁶³⁹ Furthermore, the EPO draws the line differently when the excluded category is a “business method” as opposed to a “computer program.”⁶⁴⁰ Although Article 52(2) expressly excludes both claim types,⁶⁴¹ post-*Microsoft* it appears that a computer program is more likely to clear the inventive step hurdle, whereas computer-implemented pension benefit systems, auctions, and sales estimating activities will not.⁶⁴² Regardless of which “technical” test reviewing bodies employ, or whether they conduct the analysis under Article 52 or 56, such reviews do not yield clear and satisfying results.⁶⁴³

⁶³³ Bakels & Hugenholtz, *supra* note 6, at 33.

⁶³⁴ *Id.*

⁶³⁵ *See id.*

⁶³⁶ *See* Ballardini, *supra* note 7, at 567.

⁶³⁷ *See id.*

⁶³⁸ *See Guidelines for Examination in the EPO*, *supra* note 414, Part C, ch. IV, § 11.5.

⁶³⁹ *See* Ballardini, *supra* note 7, at 567, 570.

⁶⁴⁰ *See id.* at 566–67.

⁶⁴¹ *See* EPC 2000, *supra* note 14, art. 52.

⁶⁴² *See* Ballardini, *supra* note 7, at 567 (observing that, in *Microsoft*, the Board was able to avoid the Article 52 “as such” exclusion and set the stage for future computer program patentability in Europe, although the Board had excluded, for example, pension benefit systems in *Pension Benefits Systems* and auctions in *Hitachi*).

⁶⁴³ *See id.* (“[T]he difficulty in pinpointing . . . a criterion [for assessing the patentability of computer programs] has caused the Boards to embrace various and inconsistent approaches, leading to a general lack of legal coherency in the field.”).

D. *Decision of the Enlarged Board of Appeal*

On October 22, 2008, Alison Brimlow—then President of the EPO—referred questions to the Enlarged Board of Appeal under Article 112(1) (b), asking for clarification on a number of issues concerning the patentability of computer-implemented inventions.⁶⁴⁴ Her referral was not the first request for clarification. Although national court justices have no standing to refer cases to the EPO, Lord Justice Jacob of the English Court of Appeal had suggested in *Aerotel* that certain issues needed clarification through a referral to the Enlarged Board.⁶⁴⁵ The EPO did not agree. In an informal letter dated February 22, 2007, the EPO President, Alain Pompidou, found the request for referral unnecessary.⁶⁴⁶ During oral arguments, the appellant in *Duns Licensing* submitted Justice Jacob's questions for referral to the Enlarged Board of Appeal.⁶⁴⁷ The *Duns Licensing* Board rejected the request, explaining that diverging decisions were allowable in the EPC legal system as part of the "evolution of the jurisprudence," unlike "'case law' in the strict Anglo-Saxon meaning of the term."⁶⁴⁸

Eighteen months after President Brimlow's referral, the Enlarged Board of Appeal issued what amounted to a non-decision and did not reach the merits of the questions referred, finding the referral did not meet the requirements of EPC 112(1) (b).⁶⁴⁹ When an EPO President refers questions to the Enlarged Board of Appeal, the EPC has two requirements for admissibility: first, either the questions must be answered to ensure uniform application of the law, or the questions concern points of law of fundamental importance; and second, two Boards of Appeal must have promulgated different decisions on the question referred.⁶⁵⁰ Addressing the first requirement, the Enlarged Board observed that the general subject of the patentability of computer-implemented inventions is of fundamental importance, noting the "heated debate in administrative and judicial practice" and the prob-

⁶⁴⁴ See *Referral by the President of the European Patent Office*, [2009] O.J.E.P.O. at 142–43.

⁶⁴⁵ *Aerotel*, [2007] 1 All E.R. at 236. The questions were different from those ultimately submitted by the EPO president to the Enlarged Board of Appeal. Justice Jacob specifically asked for clarification on the key characteristics of the method of doing business exclusion. See *id.* at 236, 241. This was a question not addressed by the Enlarged Board. See Reinier B. Bakels, *Software Patentability: What Are the Right Questions?* 31 EUR. INTELL. PROP. REV. 514, 520 (2009).

⁶⁴⁶ See *Programs for Computers*, [2010] O.J.E.P.O. at 12.

⁶⁴⁷ See *DUNS LICENSING*, [2008] O.J.E.P.O. at 53.

⁶⁴⁸ *Id.* at 59.

⁶⁴⁹ See *Programs for Computers*, [2010] O.J.E.P.O. at 59.

⁶⁵⁰ EPC 2000, *supra* note 14, art. 112.

lem of EPC contracting states applying different reasoning.⁶⁵¹ The Enlarged Board noted internationally “increasingly convergent decisions,”⁶⁵² which included *Duns Licensing*,⁶⁵³ the 2008 English Court of Appeal decision *Symbian Ltd v. Comptroller-General of Patents*,⁶⁵⁴ and the CAFC case *In re Bilski*.⁶⁵⁵ The Enlarged Board also noted that the failure of the European Union to harmonize EU patent law for computer-implemented inventions was evidence that where to “draw the dividing line between applications relating to programs for computers as such” and “applications related to patentable technical solutions, in the form of [computer-implemented inventions], still cannot be assumed.”⁶⁵⁶ Nonetheless, despite worldwide disharmony, the Enlarged Board did not consider the worldwide debate on the patentability of computer-implemented inventions, and diverging national decisions, relevant to their resolution of the referral.⁶⁵⁷

In addressing the second part of the test, the Enlarged Board concluded—without deciding the issue—that existing EPO case law provided for a consistent approach.⁶⁵⁸ In construing the meaning of “different decision” in the context of the EPC second requirement,⁶⁵⁹ the Enlarged Board stressed the “interpretative supremacy” of the Technical Boards of Appeal and noted that the Enlarged Board cannot develop law as do the Technical Boards of Appeal.⁶⁶⁰ The Enlarged Board found “different decisions” to mean a “conflict in case law making it difficult if not impossible for the Office to bring its patent granting practice into line with the case law of the Boards of Appeal.”⁶⁶¹ In making this determination, the Board stated:

⁶⁵¹ See *Programs for Computers*, [2010] O.J.E.P.O. at 15.

⁶⁵² *Id.* at 16.

⁶⁵³ See *DUNS LICENSING*, [2008] O.J.E.P.O. at 78.

⁶⁵⁴ See *Symbian Ltd v. Comptroller-General of Patents*, [2008] EWCA (Civ) 1066, [2009] R.P.C. 1 (A.C.) at 15–18 (Eng.).

⁶⁵⁵ See *In re Bilski*, 545 F.3d 943, 997–98 (Fed. Cir. 2008), *aff’d sub nom. Bilski v. Kappos*, 130 S. Ct. 3218 (2010).

⁶⁵⁶ See *Programs for Computers*, [2010] O.J.E.P.O. at 15–16.

⁶⁵⁷ *Id.* at 17.

⁶⁵⁸ See *Computer-Implemented Inventions (CII) in Europe—G 3/08*, FISH & RICHARDSON (May 20, 2010), <http://www.fr.com/Computer-Implemented-Inventions-CII-in-Europe—G-308-05-20-2010/>.

⁶⁵⁹ *Programs for Computers*, [2010] O.J.E.P.O. at 20–21 (finding that the provision for “different decisions” was ambiguous in the English, French, and German versions of the EPC, and resorting to the guiding principles of the Vienna Convention on the Law of Treaties to determine the intent of the EPC framers).

⁶⁶⁰ *Id.* at 22.

⁶⁶¹ *Id.* at 25.

[T]he Enlarged Board must also consider whether the divergent decisions might not be part of a constant development, possibility still ongoing, in jurisprudence on recent patent law issues, in the course of which older decisions have lost their significance and so can no longer be considered in connection with newer decisions. Such putative differences do not justify presidential referrals, legal development being one of the principal duties of the Boards of Appeal, in particular in new territory.⁶⁶²

The Enlarged Board then proceeded to review decisions in light of the referred questions to determine whether a conflict existed. The only inconsistencies the Enlarged Board found related to the referred question, “[c]an a computer program only be excluded as a computer program as such if it is explicitly claimed as a computer program?”⁶⁶³ The only “divergence” in case law the Enlarged Board identified was between the *IBM I* and *Microsoft* cases. In *IBM I*, the Technical Board of Appeal had determined that a claim to a computer program itself is patentable if it produces a “further technical effect” while it runs.⁶⁶⁴ The definition of “further technical effect” did not mention the state of the art, so that the Article 52(2) and (3) determination did not consider the prior art.⁶⁶⁵ The further technical effect does not have to be new.⁶⁶⁶ The Enlarged Board affirmed that *IBM I* consciously abandoned the “contribution approach,” and observed that the Technical Board of Appeal has not contested this shift in any decision since.⁶⁶⁷

The Enlarged Board subsequently discussed *PBS* and *Hitachi*, noting that neither case addressed whether a claim to a program on a computer readable medium avoided exclusion.⁶⁶⁸ The Enlarged Board found that *Microsoft* had extended the reasoning of *Hitachi* to decide that such claims have technical character because they relate to a computer readable medium.⁶⁶⁹ Although the positions taken in *IBM I* and *Microsoft* were different, the Enlarged Board found the differences reflected development in the case law over seven years, not different opin-

⁶⁶² *Id.* at 30.

⁶⁶³ *Id.* at 32.

⁶⁶⁴ *Id.* at 35, 37.

⁶⁶⁵ See *Programs for Computers*, [2010] O.J.E.P.O. at 37.

⁶⁶⁶ *Id.*

⁶⁶⁷ *Id.*

⁶⁶⁸ See *id.* at 39.

⁶⁶⁹ See *id.*

ions meriting a referral.⁶⁷⁰ To support this conclusion, the Enlarged Board indicated that although *IBM I* remained seminal on the further technical effect requirement for claims directed to computer software, no Technical Board of Appeal had followed *IBM I* on its technical contribution approach, and no Technical Board of Appeal had challenged the *Microsoft* approach.⁶⁷¹

In addition to acknowledging that the law in the EPO is in a state of development, the Enlarged Board expressly declined to define the term “technical.”⁶⁷² Addressing the question of whether the activity of programming a computer includes technical considerations, the Enlarged Board conceded that computer algorithms can genuinely be viewed as either a pure mathematical-logical exercise or as defining a procedure to make a machine carry out a certain task.⁶⁷³ The Enlarged Board found that the EPC takes the former view: abstract formulations of algorithms do not belong to a technical field, but require “further” technical effects to be patentable.⁶⁷⁴

The Enlarged Board’s decision neither advances the law nor clarifies where to draw the line in these cases.⁶⁷⁵ Although it did not expressly address the issue of business method patents, the Enlarged Board cited *Duns Licensing* as laying out the “elaborate system” developed by the EPO for taking the list of excluded subject matter in Article 52(2) into account in assessing the inventive step.⁶⁷⁶ The Enlarged Board did not “judge whether this system is correct.”⁶⁷⁷ Rather, it found that “it is evident from its frequent use in decisions of the Boards of Appeal that the list of ‘non-inventions’ in Article 52(2) EPC can play a very important role in determining whether claimed subject-matter is inventive.”⁶⁷⁸ Therefore, the problem-and-solution approach of Article 56 now determines whether a computer-implemented invention achieves the technical character required for patentability, and the Article 56

⁶⁷⁰ *Id.* at 45.

⁶⁷¹ *See Programs for Computers*, [2010] O.J.E.P.O. at 41–42.

⁶⁷² *Id.* at 31.

⁶⁷³ *See id.* at 58.

⁶⁷⁴ *See id.* at 58–59.

⁶⁷⁵ *See id.* at 31, 45. Nevertheless, the decision’s impact may be persuasive in shifting the practice in the U.K. Patent Office to a more favorable approach to computer-implemented inventions. *See* Chris Benson, *United Kingdom: Business as Usual for Software Patents at the EPO*, MONDAQ BUSINESS BRIEFING (May 18, 2010), <http://www.mondaq.com/article.asp?articleid=100752>.

⁶⁷⁶ *See Programs for Computers*, [2010] O.J.E.P.O. at 47.

⁶⁷⁷ *Id.*

⁶⁷⁸ *Id.*

hurdle is higher for computer-implemented business methods than for computer programs.

IV. THE U.K. AND GERMAN JUDICIAL TREATMENT OF SOFTWARE PATENTS

In this Part, we consider national treatment of software and business method patent subject-matter questions in the United Kingdom and Germany. Not only are the United Kingdom and Germany two of the most influential countries in Europe, the two countries have the most developed patent law jurisprudence in Europe.⁶⁷⁹ The U.K. patent jurisprudence in particular is well-developed, and its patent subject-matter approach to software and business method claims has clashed with EPO rulings.⁶⁸⁰ German practice, while not as divergent as U.K. practice, is likely to differ from EPO approaches in at least some respects.⁶⁸¹ We start our national analysis with a discussion of U.K. patent subject-matter practice.

A. *U.K. Patent Subject-Matter Treatment of Software and Business Method Claims*

In 1977, the United Kingdom transposed the EPC into law.⁶⁸² The Patents Act altered both substantive and procedural law so extensively that it caused the “largest culture shock in [U.K. patent] history.”⁶⁸³ Although one purpose of the EPC is harmonization of substantive patent law among the contracting states, the United Kingdom chose statutory language different from EPC Article 52.⁶⁸⁴ Differences in the wording in the U.K. statute may contribute to differing interpretations of what

⁶⁷⁹ See Ballardini, *supra* note 7, at 567 (referring to the United Kingdom and Germany as European Patent Convention “major players”).

⁶⁸⁰ See *infra* text accompanying notes 679–690.

⁶⁸¹ See *infra* text accompanying notes 843–860.

⁶⁸² Patents Act, 1977, c. 37 (U.K.); Robin Jacob, *The Herchel Smith Lecture 1993*, 15 EUR. INTEL. PROP. REV. 312, 312 (1993).

⁶⁸³ CORNISH & LLEWELYN, *supra* note 18, at 113–14, 124 (explaining that the culture shock was due in part to subjecting national and EPO patents to the same substantive regimes, and also because there was no international patent system prior to 1977). In addition to the EPC, the Patents Act implemented the Patent Cooperation Treaty and the Community Patent Convention. Patents Act, c. 37, §130(7); Jacob, *supra* note 682, at 312.

⁶⁸⁴ Compare Patents Act, c. 37, §1(2) (excluding, among other things: discoveries; aesthetic creations; methods for performing mental acts, doing business, or a computer program; and the presentation of information), with EPC *supra* note 14, art. 52(2) (excluding: discoveries; aesthetic creations; methods for performing mental acts, doing business, and computer programs; and presentation of information).

constitutes an invention.⁶⁸⁵ English courts have resorted to bypassing the Patents Act, instead directly interpreting the EPC.⁶⁸⁶ The English courts have also demonstrated a strong preference for construing the substance of a claim over its form.⁶⁸⁷ As a result, the United Kingdom's approach to excluded subject matter is much stricter than that of the EPO. One scholar noted that a "UK-based applicant for a computer-implemented invention, if he is interested solely in the British market, would be well advised to apply for such a patent at the EPO level, designating the UK as the relevant jurisdiction."⁶⁸⁸ This divergence in practice may be partially due to the nature of the legal system in the United Kingdom where *stare decisis* constrains judicial decision making.⁶⁸⁹ Although English courts make an effort to defer to EPO decisions, Technical Board of Appeal decisions are not binding.⁶⁹⁰ Rather, British patent examiners must follow English court decisions.⁶⁹¹ Thus, unless the courts have expressly approved a Technical Board of Appeal decision, the decision will have only persuasive effect before the U.K. Intellectual Property Office (UKIPO).⁶⁹² The differences in policy regarding software patent protection have resulted in a "deep rift" between EPO and British practice.⁶⁹³ The following section traces the development of the differing tests and standards in one of the most important patent-granting jurisdictions in Europe, and its convergence with and divergence from EPO standards.

⁶⁸⁵ *Disaster Pending? EPO v. English Court of Appeal on Excluded Subject Matter*, 21 World Intell. Prop. Rep. (BNA) No. 8, at 25, 26 (Aug. 1, 2007).

⁶⁸⁶ CORNISH & LLEWELYN, *supra* note 18, at 144 ("When an issue arises which is governed by the UK counterpart of an EPC . . . provision within s.130(7), an English court will . . . treat the Convention provision directly.").

⁶⁸⁷ See Jacob, *supra* note 682, at 312 ("There was, among the framers of the Convention, the notion that the British . . . read a claim in the abstract and ignored the specification.").

⁶⁸⁸ Shemtov, *supra* note 7, at 514.

⁶⁸⁹ See *id.* at 510.

⁶⁹⁰ See *id.* (arguing that the *Aerotel* court decided to follow the 1986 EPO decision in *Vi-com*, rather than the newer "trilogy" of *PBS*, *Hitachi*, and *Microsoft*, both to uphold longstanding English precedent and because they considered the approaches in the "trilogy" cases to be incorrect with regards to the language of the EPC).

⁶⁹¹ See Richard Willoughby, *United Kingdom*, in GLOBAL PATENT LITIGATION: STRATEGY AND PRACTICE 1, 19 (Willem A. Hoyng & Frank W.E. Eijssvogels eds. 2006).

⁶⁹² See Robert B. Franks, *United Kingdom*, at 18 (Supp. 2 Nov. 2008) in 1 SOFTWARE PATENT WORLDWIDE, *supra* note 437. The United Kingdom is composed of three jurisdictions: England and Wales, Scotland, and Northern Ireland. Willoughby, *supra* note 691, at 19. Most patent litigation takes place in the London-based Patents Court (High Court) and the Patents County Court. *Id.*

⁶⁹³ See Ballardini, *supra* note 7, at 569.

B. *Early English Cases*

Before implementing the EPC, English courts had shown a “distinct readiness” to allow patent claims for computer programs even if such claims did not affect the production of a distinct product.⁶⁹⁴ After the United Kingdom became a signatory of the EPC, its patent Court of Appeal cases initially tracked Technical Board of Appeals law. Nevertheless, the approaches have diverged.

Merrill Lynch's Application,⁶⁹⁵ decided a few years after *Vicom*, was the first English Court of Appeal case to address excluded subject matter under the Patents Act Section 1(2). Merrill Lynch claimed “an improved data processing based system for implementing an automated trading market for one or more securities.”⁶⁹⁶ The program automatically executed stock transactions against a customer's orders using known data-processing equipment. Both the Patents Office and the Patents Court (High Court) rejected Merrill Lynch's claim.⁶⁹⁷ The Court of Appeal agreed and by taking judicial notice of the EPO's *Vicom* decision,⁶⁹⁸ made the technical contribution approach part of U.K. precedent. The court interpreted the approach as requiring a technical advance over the prior art in the form of a new result.⁶⁹⁹ The court explained: “it cannot be permissible to patent an item excluded by Section 1(2) under the guise of an article which contains that item—that is to say, in the case of a computer program, the patenting of a conventional computer containing that program. Something further is necessary.”⁷⁰⁰ The court did not find the “something further,” like the substantially increased processing speed of the CAD program in *Vicom*.⁷⁰¹

The approach taken in *Merrill Lynch* indicated a preference for the substance of the patent claim over the claim's form. In determining whether the claim was eligible for patent protection, the court considered both the nature of the invention and the nature of the result.⁷⁰² Although a data processing system may be valid patent subject matter, if

⁶⁹⁴ CORNISH & LLEWELYN, *supra* note 18, at 823 n.94.

⁶⁹⁵ *Merrill Lynch's Application*, [1989] R.P.C. 561 (A.C.) 561 (Eng.).

⁶⁹⁶ *Id.* at 562.

⁶⁹⁷ *Id.* at 561.

⁶⁹⁸ *Id.* at 567 (stating that “[t]he decision of the board is a matter of which we are required, by section 91(1) of the Patents Act 1977, to take ‘judicial notice’”).

⁶⁹⁹ *See id.* at 569.

⁷⁰⁰ *Id.*

⁷⁰¹ *See Merrill Lynch*, [1989] R.P.C. at 569.

⁷⁰² *See id.*

Patents Act Section 1(2)(c) excludes what it produces, the invention is not valid subject matter.⁷⁰³ Even if a computer program itself is non-obvious, Section 1(2)(c) excludes the claim as a whole unless it contains non-excluded subject matter which is also non-obvious and contains an inventive step.⁷⁰⁴ The excluded subject matter is not considered for purposes of establishing inventive step.⁷⁰⁵ The court found the *Merrill Lynch* claim to a “data-processing system . . . making a trading market in securities” to be an excluded business method.⁷⁰⁶ Commentators have criticized the English approach as “applying a convoluted decision process” of determining whether a purported invention is excluded subject matter, rather than applying section 1(2) as a self-contained filter.⁷⁰⁷ The methodology adopted in *Merrill Lynch* has led to what some commentators describe as an “undue level of exclusion” in the U.K. patent system.⁷⁰⁸

The English courts consistently employ the approach of disallowing software inventions cloaked as machines or technical inventions.⁷⁰⁹ In 1991, the English Court of Appeal in *Gale’s Application* addressed whether a ROM containing a computer program is valid subject matter.⁷¹⁰ The claim described the invention as an improved iterative algorithm for computing a square root stored on the Read-Only-Memory (ROM) of a computer.⁷¹¹ The applicant argued that the characteristic distinguishing the claim from a pure abstract idea was its storage in the electronic circuitry of the computer.⁷¹² The examiner rejected the application as excluded subject matter because it was a computer program “as such.” The Patents Court reversed, however, on the grounds that the claim was not disqualified under Section 1(2) because the claim related to a new technical product.⁷¹³ Distinguishing between a non-patentable program loaded on a disk from a program loaded on the ROM, the court reasoned that “[t]here is a difference between a claim which relates to a disc containing a program and a ROM with

⁷⁰³ See *id.*

⁷⁰⁴ See Franks, *supra* note 692, at 41.

⁷⁰⁵ See *id.*

⁷⁰⁶ *Merrill Lynch*, [1989] R.P.C. at 569.

⁷⁰⁷ Franks, *supra* note 692, at 40.

⁷⁰⁸ CORNISH & LLEWELYN, *supra* note 18, at 826.

⁷⁰⁹ See e.g., *Gale’s Application*, [1991] R.P.C. 305 (A.C.) 316, 325, 328 (Eng.); *Merrill Lynch*, [1989] R.P.C. at 569.

⁷¹⁰ See *Gale’s Application*, [1991] R.P.C. at 307.

⁷¹¹ See *id.* at 308.

⁷¹² See *id.* at 308–09.

⁷¹³ *Id.* at 306.

particular circuitry.”⁷¹⁴ According to the court, the key difference was that the disk carried the program, whereas the programmed ROM’s structure was altered by the program such that it became a “dedicated piece of apparatus.”⁷¹⁵

The Court of Appeal did not agree. It characterized a “program for a computer” as “essentially a series of instructions capable of being followed by a cpu to produce a desired result.”⁷¹⁶ The Court of Appeal accurately recognized that the disk and ROM were merely different kinds of artifacts on which a program may be carried.⁷¹⁷ Comparing programs on these media to different pieces of music loaded onto compact disks, the court found the differences in storage media immaterial for purposes of determining patent eligibility.⁷¹⁸ The music was the same regardless of the chosen storage media.⁷¹⁹ Similarly, the instructions stored on a disk or ROM were also the same.⁷²⁰ The court noted that deciding otherwise would exalt “form over substance.”⁷²¹

Following the reasoning of *Vicom*, the English Court of Appeal questioned whether the instructions contained on the ROM include more than disqualified subject matter.⁷²² The court found Gale’s claim not eligible subject matter because “the claim is in substance a claim to a computer program, being the particular instructions embodied in a conventional type of ROM circuitry, and those instructions do not represent a technical process outside the computer or a solution to a technical problem within the computer.”⁷²³ Even though the program arguably made the computer more efficient, the Court of Appeal rejected the claim because it only provided the CPU with a different set of calculations for determining a square root.⁷²⁴ The program was not valid patent subject matter because it did not define a new way of operating the computer.⁷²⁵ Therefore, the claim was to the instructions, a computer program “as such.”⁷²⁶ Both *Merrill Lynch* and *Gale’s Application* illustrate the English courts’ early attempts to avoid the problem of clever draft-

⁷¹⁴ *Id.* at 316–17.

⁷¹⁵ *Id.* 317.

⁷¹⁶ *Gale’s Application*, [1991] R.P.C. at 324.

⁷¹⁷ *Id.* at 325.

⁷¹⁸ *Id.*

⁷¹⁹ *See id.*

⁷²⁰ *See id.*

⁷²¹ *Id.*

⁷²² *Gale’s Application*, [1991] R.P.C. at 327.

⁷²³ *Id.* at 328.

⁷²⁴ *See id.* at 327–28.

⁷²⁵ *See id.*

⁷²⁶ *See id.*

ing to avoid exclusion, by directly addressing the issue of substance over form in determining the nature of the invention claimed.⁷²⁷

In 1997, the English Court of Appeal heard a case involving a patent granted in Japan and submitted to the UKIPO as a matter of priority.⁷²⁸ The invention in *Fujitsu* involved both a “method and apparatus” for modeling synthetic crystal structures used for designing semiconductors and superconductors.⁷²⁹ The court noted that ordinarily a person would assemble plastic models of the structures by hand to model the new crystal structure.⁷³⁰ The claimed invention used a computer programmed to allow a human operator to “select an atom, a lattice vector and a crystal face in each of two crystal structures.”⁷³¹ The program converted the data representing the two crystal structures into data representing the physical layout of the combined structure and a pictorial display of the new structure.⁷³² Both the UKIPO and the trial court rejected the application as a computer program and “a method for performing a mental act” excluded under Section 1(2) of the 1977 Patents Act.⁷³³ The Court of Appeal, applying the technical contributions approach, also rejected the application.⁷³⁴ Following English practice of construing the invention as a whole, the court concluded as follows: “[c]learly the whole operation revolves around the computer program and the question for decision is whether there is a technical contribution so that it cannot be said that the invention consists of a computer program as such.”⁷³⁵

The result—rejecting an “invention” that used computer imaging to make the process of assembling crystal structures faster—seemed to contradict the EPO’s *Vicom* decision. The Court of Appeal in *Fujitsu* distinguished the computer imaging found patentable in *Vicom* by the way it enhanced the image produced.⁷³⁶ The court noted that the only advance made by the invention was to “enable[] the combined structure to be portrayed quicker.”⁷³⁷ The operator was still required to produce two displays of the crystal structures and the appropriate way for

⁷²⁷ See *id.* at 315.

⁷²⁸ *Fujitsu Ltd.’s Application*, [1997] R.P.C. 608 (A.C.) 610 (Eng.).

⁷²⁹ *Id.* at 612.

⁷³⁰ *Id.*

⁷³¹ *Id.*

⁷³² *Id.*

⁷³³ *Id.* at 610; see Patents Act, c. 37, § 1(2).

⁷³⁴ *Fujitsu*, [1997] R.P.C. at 614–19.

⁷³⁵ *Id.* at 618.

⁷³⁶ *Id.* at 618–19.

⁷³⁷ *Id.* at 619.

them to be superimposed.⁷³⁸ The Court of Appeal found that Fujitsu's use of computer imaging simply made the computer function more rapidly, but did not change the computer's ordinary function.⁷³⁹ The court concluded that a claim to a method for carrying out a calculation, or a method of performing a mental act, cannot be valid subject matter merely because the process is completed on a computer *unless* there is a technical contribution present.⁷⁴⁰ The fact that the computer performed the operation more quickly is not sufficient.⁷⁴¹

During the first decade of English jurisprudence regarding computer programs, English courts tracked the jurisprudence of the EPO.⁷⁴² By requiring the invention to be construed as a whole, however, English application of the technical contribution test resulted in a stricter review of claims, and thus fewer patent grants.⁷⁴³ Of the three English Court of Appeal cases applying Patents Act Section 1(2), none found the claimed invention to have sufficient technical character to fall outside the exclusions.⁷⁴⁴ The different results from the English Court of Appeal in *Fujitsu* and the EPO Technical Board of Appeal in *Vicom* are particularly difficult to reconcile.⁷⁴⁵ Both cases used a computer program that caused computer images to be completed more rapidly and efficiently than could be done manually.⁷⁴⁶

C. Recent Jurisprudence (Divergence and Convergence)

Nearly a decade had passed since *Fujitsu* when the English Court of Appeal issued its next EPC Articles 52(2) and (3) patent subject-matter decision.⁷⁴⁷ During that period, EPO jurisprudence had rejected

⁷³⁸ *Id.* at 619–21.

⁷³⁹ *See id.* at 621.

⁷⁴⁰ *Fujitsu*, [1997] R.P.C. at 621.

⁷⁴¹ *See id.*

⁷⁴² *See* Ballardini, *supra* note 7, at 568.

⁷⁴³ *See id.*

⁷⁴⁴ *See Fujitsu*, [1997] R.P.C. at 614, 619; *Gale's Application*, [1991] R.P.C. at 316–17 (Aldous J.); *Merrill Lynch*, [1989] R.P.C. at 569.

⁷⁴⁵ *See Fujitsu*, [1997] R.P.C. at 618 (attempting to distinguish the facts of *Vicom* from the facts of *Fujitsu* in order to reach a different outcome).

⁷⁴⁶ *See id.* at 612, 618; T-208/84, Computer-Related Invention/VICOM, [1987] O.J.E.P.O. 14, 17 (Technical Bd. Appeal 3.5.01, July 15, 1986), available at http://archive.epo.org/epo/pubs/oj1987/p001_046.pdf.

⁷⁴⁷ *Aerotel Ltd. v. Telco Holdings Ltd.*, [2006] EWCA (Civ) 1371, [75–76], [2007] 1 All E.R. 225 (A.C.) at 229 (Eng.); *Fujitsu*, [1997] 114 R.P.C. at 608. In *Aerotel*, Justice Jacob referred directly to the EPC, rather than to the similar language that had been implemented in the U.K. Patents Act 1977. *See Aerotel*, [2007] 1 All E.R. at 230. Various reasons contributed to this decision: differences in wording could lead to erroneous construction; the EPO Technical Board of Appeal decisions have strong persuasive authority; and the

Vicom's “technical contribution approach”⁷⁴⁸ in favor of the “any hardware approach” of *PBS*, *Hitachi*, and *Microsoft*.⁷⁴⁹ In 2006, a Court of Appeal decision rejected the EPO’s “any hardware” approach in *Aerotel*, affirming the rupture between U.K. and EPO practices which began in 2002 with *PBS*.⁷⁵⁰ *Aerotel* was actually two cases joined together on appeal: *Aerotel Ltd. v. Telco Holdings Ltd.* and *Re Macrossan’s Application*.⁷⁵¹ In the first case, Aerotel sued Telco for infringing its U.K. patent on a telephone system that provided prepayment for telephone calls.⁷⁵² Telco counterclaimed for revocation on the basis that the invention was excluded as a method for doing business.⁷⁵³ The trial court agreed with Telco and revoked the patent. Aerotel appealed.⁷⁵⁴ In the second consolidated case, *Macrossan*, the court considered a computerized method of obtaining the forms needed for incorporating a company.⁷⁵⁵ The examiner rejected the application as a method of doing business.⁷⁵⁶ The High Court affirmed that merely automating a general purpose computer to produce documents necessary to incorporate an entity, where there is no underlying technical improvement, was not valid subject matter because the essence of the invention was the automation of a mental act.⁷⁵⁷ *Macrossan* also appealed.⁷⁵⁸

Despite acknowledging the weight properly placed on EPO board decisions, the Court of Appeal declined to follow the trilogy of *PBS*,

language of the EPC creates greater potential for harmonization, as there can be more consistency in interpreting national laws that implemented the EPC. *See* Franks, *supra* note 692, at 65–66.

⁷⁴⁸ *See* *VICOM*, [1987] O.J.E.P.O. at 21; Laub, *supra* note 7, at 346 (describing the technical contribution approach).

⁷⁴⁹ *See* Case T-424/03, *MICROSOFT/Clipboard Formats*, [2006] E.P.O.R. 414, 419–20 (Technical Bd. Appeal 3.5.01, Feb. 23, 2006), *available at* <http://www.epo.org/law-practice/case-law-appeals/pdf/t030424eu1.pdf>; Case T-258/03, *Auction Method/HITACHI*, [2004] O.J.E.P.O. 575, 584 (Technical Bd. Appeal 3.5.01, Apr. 21, 2004) *available at* http://archive.epo.org/epo/pubs/oj004/12_04/12_5754.pdf; Case T-931/95, *Controlling Pension Benefit Systems Partnership/PBS PARTNERSHIP*, [2001] O.J.E.P.O. 441, 448–49 (Technical Bd. Appeal 3.5.01, Sept. 8, 2000) *available at* http://archive.epo.org/epo/pubs/oj001/10_01/10_4411.pdf.

⁷⁵⁰ *Aplin*, *supra* note 7, at 380, 381.

⁷⁵¹ *See* *Aerotel*, [2007] 1 All E.R. at 228–30.

⁷⁵² *Id.* at 229, 241–42.

⁷⁵³ *Id.* at 229.

⁷⁵⁴ *Id.* Although the parties settled prior to the substantive hearing and Telco did not take part in the appeal, Aerotel continued to have an interest in the patent, having sued another party for infringement. *Id.*

⁷⁵⁵ *Id.* at 243.

⁷⁵⁶ Franks, *supra* note 692, at 63.

⁷⁵⁷ *Id.* at 63–66.

⁷⁵⁸ *Id.* at 64.

Hitachi, and *Microsoft*, characterizing them as the “any hardware approach.”⁷⁵⁹ In a lengthy opinion and appendix, Justice Jacob highlighted the differences and inconsistencies of the approaches articulated in those cases.⁷⁶⁰ Key in his criticism was that the EPO cases treated the various categories of Article 52(2) exclusions as being limited to “something abstract or intangible.”⁷⁶¹ The English Court of Appeal disagreed, noting that the categories “are disparate with differing policies behind each.”⁷⁶² Taking computer programs as an example, the court observed that the trio of cases takes a “narrow view” of the Article 52 computer program exclusion in only excluding abstract sets of instructions.⁷⁶³ The court implicitly found that such a broad definition of valid subject matter encompassed the instructions on a disk or hard drive which “causes a computer to execute the program.”⁷⁶⁴ The court determined that the framers meant to exclude computer programs “in a practical and operable form . . . not just an abstract series of instructions.”⁷⁶⁵ Thus, the court declined to adopt the EPO’s narrower view of the exclusion into English law.⁷⁶⁶

The court went on to emphasize that it was bound by its own precedents and obligated to follow the technical contributions approach from *Vicom* as interpreted in previous English Court of Appeal cases.⁷⁶⁷ Justice Jacob synthesized the English approach, which he labeled the “technical effect approach with the rider,” as a structured four-step approach to analyzing claims. The steps include: “(1) properly construe the claim; (2) identify the actual contribution; (3) ask whether it falls solely within the excluded subject matter; (4) check whether the actual or alleged contribution is actually technical in nature.”⁷⁶⁸

Applying the four-step approach to the *Aerotel* claim, the court reversed the trial court and found for the patentee.⁷⁶⁹ In construing the system claim, the court found that the system was “actually a claim to a physical device consisting of various components.”⁷⁷⁰ Although the in-

⁷⁵⁹ *Aerotel*, [2007] 1 All E.R. at 237–38.

⁷⁶⁰ *See id.* at 238, 254–63.

⁷⁶¹ *Id.* at 238.

⁷⁶² *Id.*

⁷⁶³ *Id.*

⁷⁶⁴ *Id.*

⁷⁶⁵ *Aerotel*, [2007] 1 All E.R. at 238.

⁷⁶⁶ *Id.*

⁷⁶⁷ *Id.* at 236–37, 239.

⁷⁶⁸ *Id.* at 239–40.

⁷⁶⁹ *Id.* at 241–43.

⁷⁷⁰ *Id.* at 242.

vention used conventional telephone exchanges, the patentee added an extra piece of equipment called a “special exchange.”⁷⁷¹ The actual contribution made was a new system requiring a new physical combination of hardware—more than a method of doing business.⁷⁷² Aerotel’s use of hardware, even though it was known digital communications exchange hardware, provided the technical contribution.⁷⁷³ Justice Jacob stated, “it is true that it could be implemented using conventional computers, *but the key to it is a new physical combination of hardware*. It seems to us clear that there is here more than just a method of doing business as such.”⁷⁷⁴

By contrast, Macrossan’s invention did not fare as well. The court found the invention ineligible for patent protection because it was both a method of doing business as such and a computer program as such.⁷⁷⁵ In applying the third step, determining whether the claim’s contribution was to excluded subject matter, the claim failed.⁷⁷⁶ Justice Jacobs reasoned that “Mr. Macrossan’s method is for the very business itself, the business of advising upon and creating appropriate company formation documents.”⁷⁷⁷ The court thus rejected Macrossan’s method as a quintessential business method.⁷⁷⁸ The court distinguished this result from *Aerotel*, in which a free standing device implemented the business method.⁷⁷⁹ The court found that the contribution under step two—providing a computer program, or interactive website, to carry out the method—was a contribution exclusively to excluded matter, and therefore was not a technical contribution.⁷⁸⁰ Additionally, the claim failed the fourth step in that there was no technical contribution “beyond the mere fact of the running of a computer program.”⁷⁸¹

The divergence from EPO approaches in *Aerotel* may be due to weak logic and inconsistencies in EPO jurisprudence rather than U.K. idiosyncrasies. One scholar suggests that the primary reason the *Aerotel* court chose to follow *Vicom* was not strict adherence to English prece-

⁷⁷¹ *Aerotel*, [2007] 1 All E.R. at 242.

⁷⁷² *Id.*

⁷⁷³ *See id.*; LEITH, *supra* note 6, at 151.

⁷⁷⁴ *Aerotel*, [2007] 1 All E.R. at 242 (emphasis added).

⁷⁷⁵ *Id.* at 245 (disagreeing in part with the trial court that found the claim to a method of performing mental acts “as such,” not a method of doing business, and a computer program “as such”).

⁷⁷⁶ *Id.* at 245–47.

⁷⁷⁷ *Id.* at 247.

⁷⁷⁸ CORNISH & LLEWELYN, *supra* note 18, at 828.

⁷⁷⁹ *See id.*

⁷⁸⁰ *Aerotel*, [2007] 1 All E.R. at 247.

⁷⁸¹ *Id.*

dent, but because the court found none of the EPO “any hardware” approaches valid in light of EPC text.⁷⁸² On this reading, the Court of Appeal found it impossible to reconcile *PBS*, *Hitachi*, and *Microsoft*. Although *PBS* had addressed and rejected the method claim on fairly conventional grounds, the apparatus claim signaled a “substantial departure from previous case law” in holding “that a computer programmed to carry out the unpatentable method was not within the categories of art[icle] 52(2).”⁷⁸³ In *Hitachi*, the Board of Appeal held that the apparatus claim was neither a business method nor a computer program as such because it “comprise[d] clearly technical features, such as a ‘server computer’, ‘client computers’ and ‘a network.’”⁷⁸⁴ According to Justice Jacob, the *Hitachi* logic “most dramatically articulates the departure from earlier [EPO] reasoning—a computer when programmed to conduct a business method is not excluded by Art[icle] 52(2).”⁷⁸⁵

The *Aerotel* court was also highly critical of treating excluded matter as part of the prior art. The court used an example outside the context of computer programs and business methods to illustrate the point: “Consider for instance . . . a claim to a book . . . containing a new story the key elements of which are set out in the claim.”⁷⁸⁶ Justice Jacob characterized deeming the story part of the prior art by applying the *PBS* or *Hitachi* case reasoning as “simply not intellectually honest.”⁷⁸⁷ He also seemed “puzzled” as to why the EPO rejected applications for non-compliance with Article 56 particularly when doing so led to the same outcome as applying the test from *Vicom* at the stage of Article 52(2) analysis.⁷⁸⁸ The court criticized *Microsoft* on a number of points, but in particular targeted its very narrow definition of excludable computer programs as “just the abstract set of instructions” rather than a broader view that the term covers instructions on any medium that causes the computer to execute the program.⁷⁸⁹ Justice Jacob found this result inconsistent with decisions in both the United Kingdom and the EPO, and stated that this result would “seem to open the way in practice to the patentability in principle of any computer pro-

⁷⁸² Shemtov, *supra* note 7, at 510.

⁷⁸³ *Aerotel*, [2007] 1 All E.R. at 256–57.

⁷⁸⁴ *Id.* at 258.

⁷⁸⁵ *Id.*

⁷⁸⁶ *Id.* at 237.

⁷⁸⁷ *Id.*

⁷⁸⁸ Shemtov, *supra* note 7, at 510.

⁷⁸⁹ *Aerotel*, [2007] 1 All E.R. at 262.

gram.”⁷⁹⁰ Hence, the court’s real concern with the any hardware approach was the elevation of form over substance.⁷⁹¹

Following *Aerotel*, patent practices employed by the EPO and the UKIPO diverged significantly.⁷⁹² The *Aerotel* court did not intend its decision to be a radical departure from prior case law. Nevertheless, in applying the four-part test, the UKIPO rejected most claims directed to computer programs, even if the claim would have been valid patent subject matter prior to *Aerotel*.⁷⁹³ In summarizing the differing approaches between the UKIPO and EPO in a guide for patent practitioners, one scholar posits that the difference in current subject-matter treatments reveals different policy approaches to the subject-matter analyses.⁷⁹⁴ In the United Kingdom, the policy enshrined in the third step of the *Aerotel* test requires that if the computer-related invention falls within an excluded category, then the examiner must reject the entire claim even if parts of the claim are novel, achieve an inventive step, and make a technical contribution.⁷⁹⁵ By contrast, EPO policy favors granting patents for computer-related inventions if these requirements are met.⁷⁹⁶ In practice, applicants for computer program patents in the United Kingdom favor the EPO because the probability of receiving a patent for a computer-implemented invention in the United Kingdom remains low.⁷⁹⁷ But this divergence in approaches creates the possibility that a patent examined and granted by the EPO and registered as a patent in the United Kingdom could be invalidated under U.K. law.

Since *Aerotel*, the EPO Technical Board of Appeal has issued several decisions reaffirming the approach in *Hitachi*. *Duns Licensing*⁷⁹⁸ responded directly to the *Aerotel* court’s criticism of EPO case law and condemned the four-step approach as not “consistent with a good-faith interpretation of the European Patent Convention.”⁷⁹⁹ In light of the increasing tension between U.K. and EPO law and practice, the English

⁷⁹⁰ *Id.*

⁷⁹¹ Aplin, *supra* note 7, at 382.

⁷⁹² See Ballardini, *supra* note 7, at 569.

⁷⁹³ See Richard Taylor, *Legal Update: Hard Choices over Software*, L. SOC’Y GAZETTE, Jan. 22, 2009, at 14, 14; Wallis, *supra* note 7, at 4.

⁷⁹⁴ See Franks, *supra* note 692, at 72.

⁷⁹⁵ See *id.*

⁷⁹⁶ See *id.*

⁷⁹⁷ See *id.*; see also Wallis, *supra* note 7, at 4.

⁷⁹⁸ Case T154/04, *Estimating Sales Activity/DUNS LICENSING ASSOCS.*, [2008] O.J.E.P.O. 46 (Technical Bd. Appeal 3.5.01, Nov. 15, 2006), available at http://archive.epo.org/epo/pubs/oj008/02_08/02_0468.pdf.

⁷⁹⁹ See *id.* at 70.

Court of Appeal took a second case only two years after *Aerotel*.⁸⁰⁰ The composition of the appellate panel in *Symbian Ltd v. Comptroller-General of Patents* indicated the importance of the decision.⁸⁰¹ Two of the three justices, Justice Jacob and Justice Neuberger, sat on the *Aerotel* panel.⁸⁰² Lord Neuberger took the third spot on the panel as a special visitor to the Court of Appeal from the supreme judicial body of the United Kingdom, the House of Lords.⁸⁰³ The tone of the *Symbian* case, while markedly more deferential to European Patent Office precedent than *Aerotel*, ultimately did not change English patent law.⁸⁰⁴

The claim in *Symbian* covered a computer program for a method of “[m]apping dynamic link libraries in a computing device.”⁸⁰⁵ Link libraries are a package of small programs relating to general computer functions.⁸⁰⁶ Providing libraries allows function programs to be called up when needed, rather than replicated by each computer program.⁸⁰⁷ For instance, when a word processing program needs to use a printing function, the function can be called up from the library so that it does not need to be included in the word processing program.⁸⁰⁸ Dynamic link libraries in the prior art could be either “linked by name” or “linked by ordinal” systems.⁸⁰⁹ The patent application claimed that Symbian Ltd.’s invention would avoid difficulties and potential unreliability of prior art linked by ordinal systems.⁸¹⁰ The UKIPO denied the claim as a claim to a computer program “as such.”⁸¹¹ The English High Court ruled that by providing a technical contribution, the invention

⁸⁰⁰ See *Symbian Ltd v. Comptroller-General of Patents*, [2008] EWCA (Civ) 1066, [2009] R.P.C. 1 (A.C.) at 7 (Eng.).

⁸⁰¹ See *id.* at 1; see also *Symbian Legal Appeal Throws UK Software Patents into Confusion*, CELLULAR-NEWS (Dec. 15, 2008), <http://www.cellular-news.com/story/35181.php> [hereinafter *Symbian Legal Appeal*] (noting Judge Lord Neuberger came down from the highest U.K. court, the House of Lords, expressly to hear this case).

⁸⁰² See *Symbian*, [2009] R.P.C. at 1; *Aerotel*, [2007] 1 All E.R. at 225.

⁸⁰³ See *Symbian*, [2009] R.P.C. at 1; *Symbian Legal Appeal*, *supra* note 801.

⁸⁰⁴ Compare *Symbian*, [2009] R.P.C. at 14 (electing to follow established English precedent while politely declining to follow EPO decisions), and *de Mauny*, *supra* note 7, at 150 (noting that *Symbian* was dismissed, in part, to leave precedent standing), with *Aerotel*, [2007] 1 All E.R. at 238 (declining to follow EPO precedent without apology).

⁸⁰⁵ *Symbian*, [2009] R.P.C. at 5.

⁸⁰⁶ See *de Mauny*, *supra* note 7, at 148.

⁸⁰⁷ See *id.*

⁸⁰⁸ See *id.*

⁸⁰⁹ See *id.*

⁸¹⁰ See *Symbian*, [2009] R.P.C. at 5.

⁸¹¹ See *id.* at 6.

was not precluded from registration under Section 1(2) of the Patent Act and Article 52(2) of the EPC.⁸¹² The Court of Appeal affirmed.⁸¹³

The Court of Appeal began with a recitation of the statutory provisions and articulated its obligations to follow previous decisions as precedent.⁸¹⁴ The court also noted that it had the freedom to depart from its previous decisions in the field of patent law if the EPO Board had formed a settled view on that point of law that differed from previous decisions, but that it was not bound to do so.⁸¹⁵ The Court of Appeal concluded that “we should try to follow previous authority, we should seek to steer a relatively unadventurous and uncontroversial course, and we should be particularly concerned to minimise complexity and uncertainty.”⁸¹⁶ Nevertheless, despite three EPO cases decided after *Aerotel* applying the test from *Hitachi*,⁸¹⁷ the Court of Appeal declined to follow the approach.⁸¹⁸ In part, the court chose to do so because the law still seemed to be in a state of flux; the Enlarged Board had not settled the issue, the post-*Aerotel* decisions by the EPO were inconsistent, and the German judiciary also expressed doubts about the “any hardware approach.”⁸¹⁹

Instead of following EPO cases, the *Symbian* court employed the “technical contribution approach” introduced in *Gale’s Application*.⁸²⁰ Under this computer-targeted approach, a computer program must be more than just a “better program to qualify as patent subject matter.”⁸²¹ Something more is needed, for instance, a change in speed with which the computer works.⁸²² The claim must also “solve a ‘technical’ problem

⁸¹² See de Mauny, *supra* note 7, at 149–50 (explaining the prior history of the case, the judge’s reluctance to grant permission to appeal to the Comptroller of Patents, and recognizing that the appeal was expedited due to the impact it would have on pending British patent applications).

⁸¹³ See *Symbian*, [2009] R.P.C. at 18.

⁸¹⁴ See *id.* at 11–12 (“In principle the Court of Appeal is bound by one of its previous decisions unless that previous decision is inconsistent with a subsequent decision of the House of Lords . . . is inconsistent with an earlier Court of Appeal decision . . . or can be shown to have been arrived at *per curiam* (i.e. without reference to the relevant statutory provision or authority).”).

⁸¹⁵ See *id.* at 12.

⁸¹⁶ See *id.* at 16. The court reached its conclusion despite acknowledging, in the previous paragraph, that “the boundary between what is and is not a technical contribution is imprecise” and may not be soluble in a wholly satisfying way. *Id.* at 15.

⁸¹⁷ See *id.* at 14.

⁸¹⁸ See *id.*

⁸¹⁹ See *Symbian*, [2009] R.P.C. at 14–15.

⁸²⁰ See *id.* at 15.

⁸²¹ See *id.* at 16–17.

⁸²² *Id.* at 16.

lying within the computer itself.”⁸²³ The court concluded that a computer with the claimed program operated better than the prior art and was thus valid patent subject matter.⁸²⁴ The court considered its conclusion in light of the four-part test articulated in *Aerotel* and began with the second step because they had already sufficiently characterized the patent claim.⁸²⁵ The program’s actual contribution identified under the second step was that it made a computer operate faster and more reliably than the prior art by virtue of the claimed feature.⁸²⁶ Addressing the third step of the analysis, the court found that the claim was not solely to excluded subject matter because it included the “knock-on” effect of a computer working better.⁸²⁷ The court concluded that the invention was technical “on any view as to the meaning of the word technical.”⁸²⁸

Despite acknowledging the inevitability of the EPO granting software and business method patents where the UKIPO would not,⁸²⁹ the Court of Appeal minimized the differences in their approaches. What differs, according to the court, is where the “technical” determination is made. In the United Kingdom it remains part of the Article 52 analysis,⁸³⁰ while in the EPO it is completed with reference to Article 56.⁸³¹ The court emphasized “the strong desirability of the approaches and principles in the two offices marching together as far as possible,”⁸³² concluding that “where there may be a difference of approach or of principle, one must try to minimize the consequent differences in terms of the outcome in particular patent cases.”⁸³³

Achieving a common result is exactly what the *Symbian* court accomplished. The EPO Examining Division had already indicated it would grant a patent for Symbian’s invention.⁸³⁴ Had the *Symbian* court found the invention not valid subject matter under previous precedents and the *Aerotel* test,⁸³⁵ the conflict in approaches between the United

⁸²³ *Id.* (quoting *Gale’s Application*, [1991] R.P.C. at 328) (noting that the Symbian invention meets this requirement).

⁸²⁴ *See id.* at 17.

⁸²⁵ *See Symbian*, [2009] R.P.C. at 7.

⁸²⁶ *See id.* at 16–17.

⁸²⁷ *See id.* at 17.

⁸²⁸ *Id.*

⁸²⁹ *Id.* at 17.

⁸³⁰ *See id.* at 7.

⁸³¹ *See PBS*, [2001] O.J.E.P.O. at 456 (denying a patent because it did not meet the inventive step criterion defined in Article 56).

⁸³² *See Symbian*, [2009] R.P.C. at 7.

⁸³³ *Id.* at 18.

⁸³⁴ *Id.* at 17.

⁸³⁵ *See id.* at 17–18; *Aerotel*, [2007] 1 All E.R. at 240; de Mauny, *supra* note 7, at 151.

Kingdom and the EPO would have widened considerably. By ruling that software that improves the operation of a computer is valid patent subject matter, *Symbian* moderated the UKIPO practice of rejecting applications that did not have an external effect.⁸³⁶ On December 8, 2008, the UKIPO issued a Practice Notice⁸³⁷ based on *Symbian* that confirmed the four-step test.⁸³⁸ The Practice Notice concluded that “a program that results in a computer running faster or more reliably may be considered to provide a technical contribution even if the invention solely addresses a problem in the programming.”⁸³⁹ Some commentators have concluded that *Symbian* will result in the UKIPO issuing more patents on computer-implemented inventions,⁸⁴⁰ particularly because patent attorneys will make sure to emphasize the “knock-on” technical effects in patent applications.⁸⁴¹

Although the U.K. and EPO results converged in *Symbian*, the saga is far from over.⁸⁴² The approaches to determining technicality still differ. What might be a technical solution to a technical problem under EPO Article 56 analysis will not necessarily constitute a technical contribution under U.K. Article 52(2) analysis.⁸⁴³ Because a European patent may be challenged for validity in an English court,⁸⁴⁴ courts could find themselves in a dilemma if one of those instances presaged in the *Symbian* decision⁸⁴⁵ occurred, in which the different approaches lead to divergent results. Further, at least one commentator describes the UKIPO Practice Notice as “a grudging concession” that computer-implemented inventions may be patented if there is no external effect.⁸⁴⁶ The Practice Notice explicitly states that “examiners will object to the computerization of what would be a pure mental act if done without the aid of a computer as both a mental act and a computer program as such.”⁸⁴⁷ Nevertheless, it is possible the UKIPO may reject

⁸³⁶ See *Symbian*, [2009] R.P.C. at 17; INTELLECTUAL PROP. OFFICE, PRACTICE NOTICES: PATENTS ACT 1977: PATENTABILITY OF COMPUTER PROGRAMS ¶ 3 (Dec. 8, 2008) available at <http://www.ipo.gov.uk/pro-types/pro-patent/p-law/p-pn/p-pn-computer.htm> [hereinafter IPO].

⁸³⁷ See IPO, *supra* note 836, ¶ 1.

⁸³⁸ See *Symbian*, [2009] R.P.C. at 1.

⁸³⁹ See IPO, *supra* note 836, ¶ 5.

⁸⁴⁰ Wallis, *supra* note 7, at 4.

⁸⁴¹ Taylor, *supra* note 793, at 15.

⁸⁴² See de Mauny, *supra* note 7, at 151; Renao Marchini, *Patently Better*, 83 EUR. LAW. 14, 15 (2008).

⁸⁴³ See Shemtov, *supra* note 7, at 512.

⁸⁴⁴ Patents Act, c.37, § 74.

⁸⁴⁵ *Symbian*, [2009] R.P.C. at 14–15.

⁸⁴⁶ See *Symbian Legal Appeal*, *supra* note 801; see also Wallis, *supra* note 7, at 4.

⁸⁴⁷ IPO, *supra* note 836, ¶ 8.

applications based on the mental acts exclusion where it would have previously done so under the computer program exclusion.

D. *German Patent Subject-Matter Treatment of Software and
Business Method Claims*

A robust analysis of German law and practice in the area of computer software and business methods is beyond the scope of this Article. Nevertheless, a brief discussion serves to highlight problems within the European patent community, accentuating the need for clear definitions of the EPC exceptions and an appellate body to resolve interpretive differences among the national jurisdictions.

The Bundesgerichtshof (BGH) has attempted to articulate an appropriate test for technicality in the context of computer-implemented inventions over the last decade.⁸⁴⁸ Despite the BGH's repeated assertions that its decisions are in line with EPO case law, its interpretations may differ.⁸⁴⁹ Commentators have characterized Germany's approach to software patents as more cautious than the EPO.⁸⁵⁰ As a result, the validity of EPO patents is frequently contested in infringement proceedings in the German Patent Court.⁸⁵¹ The BGH has developed a two-part test that appears roughly equivalent to the general contours of EPO practice, in which technicality is assessed as part of both Article 52 and Article 56 analyses.⁸⁵² In German practice, the invention must possess technical character, which is assessed independently from novelty and inventive step criteria.⁸⁵³ The second step requires an objective technical contribution over the prior art and a solution to a technical problem.⁸⁵⁴ This step mandates a technical teaching directed to the solution of a

⁸⁴⁸ See Hans Wegner, *Germany*, 12 *in* 1 SOFTWARE PATENTS WORLDWIDE (Supp.4 Dec. 2009), *supra* note 437. Although, as a civil law system, these cases do not have the precedential weight, examiners of the German Patent and Trademark Office typically refer directly to decisions of the Federal Patent Court and the BGH, giving these cases practical importance. *See id.* at 10.

⁸⁴⁹ *Id.* at 11. *But see Aerotel*, [2007] 1 All E.R. at 269 (noting that the BGH did not consider the computer program exclusion from EPO case law, and so neglected to take EPO case law into account).

⁸⁵⁰ See Stephan Dorn, *German Supreme Court Widens the Door for Software Patents*, INTELL. PROP. EXPERT GROUP (May 30, 2010), <http://www.ipeg.eu/?p=1347>.

⁸⁵¹ *See id.*

⁸⁵² *See* Wegner, *supra* note 848, at 6.

⁸⁵³ *Id.*

⁸⁵⁴ *Id.* at 6, 17 (describing a test for an objective technical contribution and summarizing BGH case law requiring a solution to a technical problem).

specific technical problem.⁸⁵⁵ The two criteria have changed in importance over the last several years. Currently the latter step is more important.⁸⁵⁶

The April 2010 decision, *Dynamische Dokumentengenerierung* (*Siemens*) is the most recent attempt to articulate the contours of German law.⁸⁵⁷ As one scholar points out, the fact that the BGH has decided two cases in 2009 and 2010 indicates that the Federal Patent Court is “trying to understand the boundaries” of patent law in this area.⁸⁵⁸ The Federal Patent Court determines which appeals to send to the BGH,⁸⁵⁹ and only certifies appeals if there is “a legal question of fundamental importance” or a BGH decision is “needed for consistent interpretation” of the law. Thus, having the BGH decide two cases in this time span is significant.⁸⁶⁰ Commentators and even legal practitioners are unable to agree on the impact of the *Siemens* decision. Whereas some commentators hail the *Siemens* case as a “landmark decision” that marks a break from past decisions and goes much further than EPO practice,⁸⁶¹ other commentators view the decision as “a continuation of a long line of thinking by the German courts” that is very similar to the EPO approach.⁸⁶²

Regardless of *Siemens*’s impact, looking to German decisions for a definition of “technical” is not fruitful. In 2000, the BGH expressly acknowledged that there is no objective definition of technology in the context of determining whether a particular claimed invention is technical.⁸⁶³ Therefore, “technical” has a dynamic meaning which can be

⁸⁵⁵ See Klaus Melullis, *Some Problems of Patent Law from a German Viewpoint*, 13th *European Patent Judges’ Symposium*, [2007] O.J.E.P.O. (SPECIAL EDITION 2), 184, 184–86.

⁸⁵⁶ See *id.* at 186.

⁸⁵⁷ *Beschluss Xa ZB 20/08: Dynamische Dokumentengenerierung* [Dynamic Document, Generation] BUNDESGERICHTSHOF (Apr. 22, 2010), http://www.bundesgerichtshof.de/chn_134/DE/Entscheidungen/EntscheidungenBGH/entscheidungenBGH_node.html (click on “Zugang zur Entscheidungsdatenbank des Bundesgerichtshofs”; in “Dokumentsuche” box on left, type “Xa ZB 20/08” in “Aktenzeichen” field; click “Suchen”; follow the hyperlink to “Xa ZB 20/08”).

⁸⁵⁸ See Rob Harrison, *Flooding Germany with Software Patents?*, TANGIBLE IP (May 23, 2010), <http://www.tangible-ip.com/2010/flooding-germany-with-software-patents.htm>.

⁸⁵⁹ *Id.*

⁸⁶⁰ Wegner, *supra* note 848, at 9.

⁸⁶¹ *German Federal Supreme Court Opens the Door for Software Patents*, KAYE SCHOLER LLP (June 10, 2010), http://www.kayescholer.com/news/client_alerts/20100610/_res/id=sa_File1/IPCA20100610.pdf.

⁸⁶² See Harrison, *supra* note 858.

⁸⁶³ See Case No. X ZB 15/98, *Speech Analysis Apparatus*, [2002] 3 Int’l Rev. Indus. Prop. Copyright L. 343, 344–45 (Bundesgerichtshof [BGH] [Federal Court of Justice] May 11, 2000) (Ger.); see also Ballardini, *supra* note 7, at 572.

treated differently in the context of technological developments.⁸⁶⁴ In extrajudicial comments, Judge Melullis of the BGH marginalized the word “technical” because “when assessing software as such, the program’s interdependence with the technical device makes the technical content too hard to deny.”⁸⁶⁵ Hence, in the context of computer-implemented inventions, the meaning of technical as used by German courts remains unclear.

CONCLUSION

In addressing Justice Ginsburg’s query about whether Europe provides a solution to the U.S. business method and software patent conundrum, our analysis clearly answers in the negative. As the *Bilski v. Kappos* petitioner stated with respect to Europe’s technology requirement, “technology . . . can be a difficult term.”⁸⁶⁶ Technology is a difficult term, particularly as it relates to whether and under what conditions business methods, computer programs, algorithms, and mental acts that are embodied in machines should receive patents as a matter of policy and practice. Instead of serving as a panacea for U.S. patent examiners and courts, the European technical requirement fails to provide a meaningful constraint for software patents and many business method patents on either side of the Atlantic.

Uncertainty and evolving standards characterize all patent systems examined in this Article. The United States treats all business methods and software as eligible patent subject matter, whereas the EPC, U.K., and German patent systems exclude all business methods that are not computer implemented.⁸⁶⁷ Beyond these basic observations, ambiguity about the nature and extent of patent subject matter permeates all these patent systems. *Bilski* injected significant uncertainty in a relatively settled area of law by rejecting *State Street Bank*’s “useful, concrete, and tangible result” test and inviting the CAFC to develop a new subject-matter test based on the abstract ideas exclusion.⁸⁶⁸ In Europe, the certainty of the business method and software exclusions vanishes where patent claims include a computer or software component. For such applications, European patent courts analyze the technicality of the com-

⁸⁶⁴ See Ballardini, *supra* note 7, at 572.

⁸⁶⁵ See *Symbian*, [2009] R.P.C. at 11 (quoting Judge Melullis of the BGH at a 2006 Symposium for European Patent Judges).

⁸⁶⁶ Transcript of Oral Argument at 12, *Bilski v. Kappos*, 130 S. Ct. 3218 (2010) (No. 08-964).

⁸⁶⁷ See *supra* Parts II–IV.

⁸⁶⁸ See *Bilski v. Kappos*, 130 S. Ct. 3218, 3259 (2010) (Breyer, J. concurring).

ponent, where there is no commonly recognized definition of technical.⁸⁶⁹ Thus, in the United States uncertainty of subject-matter exclusion exists for business methods only, whereas in Europe business methods and software are excluded unless they constitute parts of a mixed claim involving “something more.”⁸⁷⁰

It is this “something more” that is so difficult to characterize and that results in uncertainty. In the United Kingdom, the analysis of technicality is part of the subject-matter test, where English courts require a “technical contribution” or external “knock on” effect of a computer working better.⁸⁷¹ The closest U.S. analog to the U.K. external effect requirement would be a weak physical transformation test.⁸⁷² German courts and the EPO have moved the computer-implemented business method and software technicality determination to their inventive step or obviousness analysis.⁸⁷³ This test asks whether the invention provides a technical solution to a technical problem.⁸⁷⁴ This appears somewhat analogous to the now-discredited test proposed in *Parker v. Flook*, which required examiners to evaluate the novelty and non-obviousness contributions of an invention only after completely discounting any contribution due to a mathematical algorithm.⁸⁷⁵ In order to provide a closer analogy to tests used in Europe, the *Flook* test would need to treat the business method component of patent claims as contributions that are well known in the art.⁸⁷⁶

The European test—pejoratively labeled the “any hardware test”—has evolved to bar naked business methods and little else.⁸⁷⁷ Like the U.S. pattern, where incrementally more types of inventions receive sub-

⁸⁶⁹ See *supra* text accompanying notes 359, 861; see also CFPH LLC’S Application, [2005] EWHC (Pat) [14], [2006] R.P.C. 259, 267 (Eng.) (“[T]he word ‘technical’ is not a solution. It is merely a restatement of the problem in different and more imprecise language.”).

⁸⁷⁰ See, e.g., Case T-208/84, Computer-Related Invention/VICOM, [1987] O.J.E.P.O. 14, 21–22 (Technical Bd. Appeal 3.5.01, July 15, 1986), available at http://archive.epo.org/epo/pubs/oj1987/p001_046.pdf (reasoning that a traditionally patentable technical process involving computer software and a computer apparatus should not be excluded solely by virtue of the fact that software is part of the claim, thereby suggesting that the hardware component of the claim was “something more”).

⁸⁷¹ See *supra* text accompanying notes 820–828.

⁸⁷² See *In re Bilski*, 545 F.3d 943, 962–63 (Fed. Cir. 2008), *aff’d sub nom. Bilski*, 130 S. Ct. 3218.

⁸⁷³ See Wegner, *supra* note 848, at 6.

⁸⁷⁴ See *id.*; Melullis, *supra* note 855, at 186.

⁸⁷⁵ See 437 U.S. 584, 595–96 (1978).

⁸⁷⁶ See *id.*

⁸⁷⁷ See *Aerotel Ltd. v. Telco Holdings Ltd.*, [2006] EWCA (Civ) 1371, [75–76], [2007] 1 All E.R. 225 (A.C.) at 237 (Eng.); Steinbrenner, *supra* note 437, at 66.

ject-matter treatment, following the 2006 EPO decision in *Microsoft* even computer programs are patentable provided they achieve a further technical effect.⁸⁷⁸ The European analogy to U.S. patent law development differs in two significant respects. First, there is no evidence that European patent law will continue expanding patent protection to business methods. No case in any of the examined jurisdictions has granted patent protection to “naked” business methods or business methods “as such.”⁸⁷⁹ Second, English patent courts appear only grudgingly to acquiesce to the EPO practice of granting patents on computer programs that lack an external effect.⁸⁸⁰ Hence, whereas European patent reviewing bodies are in consensus about business methods, there is considerable uncertainty surrounding the boundaries of software patentability—and likely significant discord between patent jurisdictions over the proper treatment of software patents. Thus, other than Europe’s unified support for its business method exclusion—an exclusion that the Supreme Court in *Bilski* refused to embrace⁸⁸¹—Europe has little to offer the United States that can enhance clarity and certainty in U.S. patent subject-matter practice.

Unfortunately, the U.S. approach to business method and software subject-matter review could use an infusion of outside guidance. Rather than increase clarity, *Bilski* has increased ambiguity and uncertainty about what inventions constitute eligible subject matter. By rejecting the machine or physical transformation test⁸⁸² as the threshold requirement for patentability and likely rejecting the CAFC’s useful, concrete and tangible test,⁸⁸³ the USPTO and practitioners are left with no test—other than the abstract ideas exclusion⁸⁸⁴—to provide guidance. *Bilski* provides neither a clear rule nor a prohibition on the patenting of naked business methods unless they constitute abstract ideas. Further, as the Kennedy plurality observes, the suggestion that the “machine-or-transformation test is useful ‘for evaluating processes similar to those in

⁸⁷⁸ See Case T-424/03, MICROSOFT/Clipboard Formats I, [2006] E.P.O.R. 414, 420 (Technical Bd. Appeal 3.5.01, Feb. 23, 2006), *available at* <http://www.epo.org/law-practice/case-law-appeals/pdf/t030424eu1.pdf>; Laub, *supra* note 7, at 351–54.

⁸⁷⁹ See *supra* Parts III–IV; see also Bakels & Hugenholtz, *supra* note 6, at 21–22 (“To many European observers business method patents represent a horrific prospect—yet another example of unwanted ‘Americanisation’. Even those who are in favour of software patenting usually are vehemently opposed to patenting business methods.”).

⁸⁸⁰ See *supra* text accompanying note 846.

⁸⁸¹ See 130 S. Ct. at 3229.

⁸⁸² See *id.* at 3225.

⁸⁸³ See *id.* at 3232 (Stevens, J., concurring).

⁸⁸⁴ See *id.* at 3229 (majority opinion) (“In searching for a limiting principle, this Court’s precedents on the unpatentability provide useful tools.”).

the Industrial Age,’ but is less useful ‘for determining the patentability of inventions in the Information Age’” indicates that the courts may employ different subject-matter tests for new technologies.⁸⁸⁵

This Article contends that such movement is in error. Information-age technology is not qualitatively different from industrial-age technology. It still must qualify as either a process, machine, manufacture, or composition of matter.⁸⁸⁶ Pre-information-age patent jurisprudence is capable of providing the clarity sorely lacking in current U.S. patent jurisprudence. Rather than rendering cautious decisions based on future unimagined and unimaginable technological developments, U.S. courts should rely on legislative bodies to address gaping legal deficiencies with respect to new technologies if such technologies develop.

Ironically, both the EPO Enlarged Board of Appeal and the U.S. Supreme Court fail to provide or increase clarity concerning the subject-matter treatment of software and business method patents in their recent opinions.⁸⁸⁷ What prevents the finding of a consistent approach to patent subject-matter determinations is the absence of any significant policy guidance in a highly politicized arena. This absence has been particularly problematic in Europe due to the plethora of national patent systems governed predominantly by a civil-law tradition that does not adhere to the doctrine of *stare decisis*. The result has been a multiplicity of approaches to the software patent subject-matter question in the EPO and national courts, with no clear definition of what is “technical” over the last twenty years.⁸⁸⁸ The absence of sufficient political willpower to provide policy guidance is evident from the failure of the European Union to implement a directive harmonizing the treatment of computer-implemented inventions. Moreover, the inability to remove “programs for computers” from the list of excluded subject matter in EPC 2000, despite years of granting patents for computer software products, further evidences this inertia.⁸⁸⁹

⁸⁸⁵ *Id.* at 3235 (Stevens, J., concurring) (describing the plurality’s suggestion).

⁸⁸⁶ *See* 35 U.S.C. § 101 (2006).

⁸⁸⁷ *See Bilski*, 130 S. Ct. at 3228–30 (declining to adopt general principles of patent protection and issuing a narrow holding for the case at hand); Case T-154/04, *Estimating Sales Activity/DUNS LICENSING ASSOCS.*, [2008] O.J.E.P.O. 46, 66 (Technical Bd. of Appeal 3.5.01, Nov. 15, 2006), *available at* http://archive.epo.org/epo/pubs/oj008/02_08/02_0468.pdf (“Thus it will remain incumbent on office practice and case law to determine whether subject-matter claimed as an invention has a technical character.”); *see also* Ballardini, *supra* note 7, at 563.

⁸⁸⁸ *See* Ballardini, *supra* note 7, at 567.

⁸⁸⁹ *Cf.* EPC 2000, *supra* note 14, art. 52 (maintaining computer program exception in the amended provision).

By contrast, changes in the U.S. approach have spanned a much greater time period and have not suffered the European problem of conflicting contemporaneous treatments of the patent subject-matter question. The U.S. constitutional mandate is to grant patents that promote the useful arts.⁸⁹⁰ The legislative mandate includes patent protection for “new and useful processes.”⁸⁹¹ No inventions or advances are explicitly excluded under U.S. law. This approach differs sharply from the EPC. EPC Article 52 explicitly excludes business methods and computer programs from patent subject matter.⁸⁹² Nonetheless, the Article 52 exclusion includes the cryptic “as such” modifier.⁸⁹³ The meaning of this terse phrase is the root of the controversy in Europe.

In the absence of legislative guidance, U.S. common law developed a seemingly sound approach to dealing with subject-matter issues for patent process claims. This case law excluded claims for abstract ideas, laws of nature, and mathematical expressions and algorithms.⁸⁹⁴ The machine or physical transformation test was a product of this case law.⁸⁹⁵ Due to the absence of clear standards, however, the U.S. Supreme Court has been hesitant to extend these principles to new, and ostensibly different, information-age technology. In the past, this reticence facilitated the expansion of patent subject matter to include all new inventions regardless of application or type.⁸⁹⁶

In *Bilski*, the Court also failed to provide clarification or guidance in this area, by “not commenting on the patentability of any particular invention, let alone holding that any of the above-mentioned technologies from the Information Age should or should not receive patent protection.”⁸⁹⁷ Whether or not the Court’s reticence is warranted, its reluctance to act emphatically is likely due to the legislative nature of the requested decision. The task of drawing patent subject-matter boundaries is a policy decision that the courts have been uncomfortable making. In *Bilski*, the Supreme Court continued its practice of asking Con-

⁸⁹⁰ See U.S. CONST. art. I, § 8, cl. 8.

⁸⁹¹ See, e.g., *Diamond v. Chakrabarty*, 447 U.S. 303, 308 (1980).

⁸⁹² See EPC 2000, *supra* note 14, art. 52.

⁸⁹³ See *id.* art. 52(3).

⁸⁹⁴ See *Bilski*, 130 S. Ct. at 3225 (acknowledging the existence of only three exclusions from patent subject matter: laws of nature, physical phenomena, and abstract ideas) (citing *Chakrabarty*, 447 U.S. at 309); see also *Gottschalk v. Benson*, 409 U.S. 63, 71–73 (1972) (finding mathematical formulas and algorithms to be non-patentable).

⁸⁹⁵ See, e.g., *Cochrane v. Deener*, 94 U.S. 780 (1876).

⁸⁹⁶ See *Bilski*, 130 S. Ct. at 3225 (acknowledging “broad patent-eligibility principles” with relatively few exceptions).

⁸⁹⁷ *Id.* at 3228.

gress to address “the great challenge in striking the balance between protecting inventors and not granting monopolies over procedures that others would discover by independent, creative application of general principles.”⁸⁹⁸ Thus far, Congress has not responded to such entreaties. In fact, other than adding a section to the Patent Act that provides a prior-use defense for business method patents, Congress has not addressed business method or software patent claims at all.⁸⁹⁹

Europe has lagged in this seemingly inexorable march to remove most restrictions on patent subject matter, but may not be far behind. The trend in Europe is toward recognizing claims as valid patent subject matter as long as they are computer implemented.⁹⁰⁰ The United Kingdom—with its strong common law tradition of limiting patent subject matter—has offered the most resistance to this trend, but may be forced to yield under pressure to make its patent law consistent with EPO practice.⁹⁰¹ It is telling that the Enlarged Board of Appeal recently ruled that there is no conflict in patent subject-matter treatment under the EPC, despite multiple Technical Board of Appeal decisions with seemingly conflicting approaches.⁹⁰² First, nothing but the elusive “technical” requirement is left to prevent EPO case law from continuing its evolution in the direction of the more lax U.S. approach to patent subject-matter treatment. Whereas Europe is unlikely to adopt the complete absence of restrictions characteristic of U.S. patent practice, the dissipation of any remaining restrictions on software patents in Europe is a real possibility. Second, it is clear that the United States will not find any answers to its software and business method patent conundrum from the European patent system.

The curious reference to *In re Bilski* in the Enlarged Board of Appeal decision⁹⁰³ suggests that the EPO may have been looking to the United States for leadership and that it approved an approach that demonstrated a movement toward harmonization. The type of judicial leadership that Europe would most likely accept is an unequivocal policy statement that provides concrete and practical restrictions to business method and computer-implemented inventions. *Bilski* did not pro-

⁸⁹⁸ *Id.*

⁸⁹⁹ 35 U.S.C. § 273(b)(1) (2006); see Hill & Cangolosi, *supra* note 366, § 7 (concluding that there have been few legislative amendments to U.S. patent law since 1952).

⁹⁰⁰ See Grosche, *supra* note 359, at 273–74; Thomas & DiMatteo, *supra* note 1, at 21–23.

⁹⁰¹ See Aplin, *supra* note 7, at 379–80; Shemtov, *supra* note 7, at 510.

⁹⁰² See Case G-3/08, Programs for Computers, [2010] O.J.E.P.O. 10, 30 (Enlarged Bd. Appeal, May 12, 2010) available at http://archive.epo.org/epo/pubs/oj011/01_11/01_0101.pdf (dismissing President’s referral to establish uniformity under the EPC 2000).

⁹⁰³ See *id.* at 16.

vide such a clear elucidating standard.⁹⁰⁴ It is thus unlikely that European courts will consider anything in the decision worth emulating.

U.S. courts, including the *Bilski* Court, erroneously suggest that case law is inadequate to deal with rapidly changing technology.⁹⁰⁵ The Supreme Court's final two statutory subject-matter decisions of the twentieth century ruled on cutting edge patent claims. In *Diamond v. Diehr*, the Court validated a computer-controlled rubber curing process.⁹⁰⁶ In *Diamond v. Chakrabarty*, the Court validated a patent for a genetically engineered microorganism capable of oil decomposition processes.⁹⁰⁷ Although the technology in the two cases was pioneering, both claims fit into categories that were clearly envisioned during the time of the first Patent Act. The *Diehr* claim covered an industrial process⁹⁰⁸ and the *Chakrabarty* claim covered a manufacture,⁹⁰⁹ two types of innovation that are listed in Section 101 of the Patent Act.⁹¹⁰ By contrast, the alarm limit and BCD processes invalidated in *Flook* and *Benson*, respectively, would not qualify as industrial processes.⁹¹¹ *Bilski* is in line with these results because the machine-or-transformation test remains a "useful and important clue" to patentability. The petitioners' claims to the concept of "hedging," and its reduction to a mathematical formula, were unanimously invalidated.⁹¹² Nevertheless, the plurality refused to draw a clear line for a case more difficult than *Bilski*.⁹¹³

The Supreme Court missed the opportunity to bring U.S. patent law closer to that of the EPO by failing to resurrect the moribund business method patent exclusion that the CAFC nullified in *State Street Bank*.⁹¹⁴ Nevertheless, in holding that the machine-or-transformation test is "a useful and important clue" to the patentability of processes, and not endorsing the *State Street Bank* test,⁹¹⁵ the Court moved toward

⁹⁰⁴ See *Bilski*, 130 S. Ct. at 3228.

⁹⁰⁵ See *id.* at 3227; see also *Benson*, 409 U.S. at 72–73.

⁹⁰⁶ *Diamond v. Diehr*, 450 U.S. 175, 177 (1981).

⁹⁰⁷ See *Chakrabarty*, 447 U.S. at 305.

⁹⁰⁸ See *Diehr*, 450 U.S. at 184.

⁹⁰⁹ See *Chakrabarty*, 447 U.S. at 309.

⁹¹⁰ 35 U.S.C. § 101 (2006).

⁹¹¹ See *Flook*, 437 U.S. at 594–95; *Benson*, 409 U.S. at 71–72.

⁹¹² See *Bilski*, 130 S. Ct. at 3231, 3232 (Stevens, J., concurring), 3257–58 (Breyer, J. concurring). The majority held that the claim was not patentable because it represented an abstract idea, but Justices Stevens and Breyer would have held that the method was not a process, and therefore not patentable. *Id.* at 3231–32, 3257–58.

⁹¹³ See *id.* at 3231 (Stevens, J., concurring).

⁹¹⁴ See *id.*; *State St. Bank & Trust Co. v. Signature Fin. Grp. Inc.*, 149 F.3d 1368, 1375 (Fed. Cir. 1998).

⁹¹⁵ See *Bilski*, 130 S. Ct. at 3227; *State St. Bank*, 149 F.3d at 1375.

limiting the patentability of naked business methods. Still, a more clearly delineated test that could provide guidance in both the United States and Europe would be far better than the *Bilski* outcome.

This Article suggests that judicial bodies in the United States and Europe have weakened statutory subject-matter standards in favor of protecting business methods and software patent claims, due to the lack of clear policy mandates. Even the United Kingdom, perhaps the last holdout against the movement in favor of expansive coverage, has started to relent under pressure to be consistent with EPO practice. The U.S. Supreme Court had the opportunity to institute legal standards that provide welfare-enhancing innovation incentives and reduce the anti-competitive effects from broad recognition of business method and software patents. Although the Court recognized the need to balance protecting inventors with protecting the community against government-sanctioned monopolies, the Court declined to indicate “where that balance ought to be struck.”⁹¹⁶ Unfortunately, the United States Supreme Court missed the opportunity to create clear limits to statutory subject matter. Doing so may have encouraged Europe to reform its patent policy, and perhaps brought both sides of the Atlantic closer to a truly harmonized patent policy.

⁹¹⁶ *Bilski*, 130 S. Ct. at 3228.

